PC720/740/750/770

SERVICE MANUAL

REVISION 0

Canon

AUG. 1994

FY8-13DA-000

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Imprimé au Japon

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INTRODUCTION

This Service Manual contains the basic facts and figures about the plain paper copier PC720/740/750/770, and is compiled to serve as a handy reference for servicing the machine in the field.

This Service Manual consists of the following chapters:

In CHAPTER 1, "GENERAL DESCRIPTION," a brief discussion of the copier's features, specifications, and an explanation of its operation are given.

CHAPTER 2 "COPYING PROCESS" deals with the inner workings of the copier associated with the generation of copies.

CHAPTER 3 "OPERATIONS AND TIMING" explains how the copier's electrical and mechanical systems are related to each other with respect to functions and timing of operations.

In CHAPTER 4, "MECHANICAL SYSTEM," the copier's mechanical system is discussed as to its operation, disassembly, reassembly, and adjustment.

CHAPTER 5 "INSTALLATION" gives step-by-step instructions for installing the copier together with checks to make for each step.

CHAPTER 6 "MAINTENANCE AND SERVICING" contains tables of replacement parts and consumables.

In addition to the above chapters, this Service Manual contains a set of appendixes consisting of a general timing chart and general circuit diagrams.

A separate document entitled Service Handbook is also available for troubleshooting problems in the copier.

Note:
The contents of this manual may be updated from time to time to reflect improvements rendered to the copier; a Service Information Bulletin will be issued as necessary to cover major changes.
All service persons are expected to be thoroughly familiar with the information contained in this manual, Service Handbook, and Service Information Bulletins, for quick response to the user's needs.

The PC720, PC740, PC750, and PC770 differ from each other for the following respects:

Model	Singlefeeding (manual)	Multifeeding (manual)	Copying speed (cpm)
PC720	✓	—	8
PC740	✓	—	10
PC750	—	✓	10
PC770	—	✓	12

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CHAPTER 1

GENERAL DESCRIPTION

I. FEATURES 1-1
II. SPECIFICATIONS 1-2
III. NAMES OF PARTS 1-6
IV. OPERATIONS 1-8

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I. FEATURES

1. **Fixed copyboard with zooming.**
   - In addition to the default reproduction ratios, a ratio between 70% and 141% may be selected.

2. **Designed with considerations for the environment.**
   - The use of a charging roller helps to limit the generation of ozone; average of 0.01 ppm or less, maximum of 0.02 ppm or less. (1/100 to 1/000 of existing machines)

3. **Uses a SURF fixing assembly.**
   - The use of the SURF fixing mechanism enables a 0-sec wait time.
   - In addition, the maximum power consumption is 0.98 kW or less.

4. **Integrated cartridge for ease in maintenance work.**
   - The photosensitive drum, toner, charging roller, developing assembly, and cleaning assembly are constructed as an integrated, single entity—the user may simply replace the cartridge and perform simple cleaning work to ensure stable copy images.

5. **Cassette accommodating various types of paper and 2-way pick-up.**
   - The universal cassette (about 250 sheets) accommodates paper of sizes between A4 and A5.
   - In addition, sheets as large as A4 to business card may be used (manual).

6. **Extra touches to the copies.**
   - The black toner cartridge may be replaced with a color toner cartridge (red, blue, green, brown); using overlay mode, copies may be given an extra finish.

7. **Separate top unit.**
   - The copier's top unit may be opened to make jam removal easy.

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II. SPECIFICATIONS

1. Type

Item	PC720	PC740	PC750	PC770
Body	Desktop			
Copyboard	Fixed			
Light source	Fluorescent lamp (19 W)			
Lens	Fixed lens array			
Photosensitive medium	OPC (24 dia.)			

2. System

Item		PC720	PC740	PC750	PC770
Copying		Indirect static reproduction			
Charging		Roller (direct charging)			
Exposure		Slit (moving light source)			
Copy density adjustment		Automatic (AE) or manual			
Development		Dry			
Pick-up	Auto	Cassette (1 holder)			
	Manual	Singlefeeder		Multifeeder	
Separation		Curvature separation + static eliminator			
Fixing		Flat heater			
Cleaning		Blade			
Original orientation		Center reference (copyboard)			

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3. Performance

Item			PC720	PC740	PC750	PC770
Original type			Sheet, book, 3-D object (2 kg max.)			
Maximum original size			A4/LGL			
Reproduction ratio		DIRECT	1 : 1			
		REDUCE I	1 : 0.707			
		REDUCE II	1 : 0.865			
		ENLARGE I	1 : 1.414			
		ENLARGE II	1 : 1.154			
		ZOOM	1 : 0.700 to 1.410			
Wait time			0 sec (approx.; at 20°C/68°F)			
First copy time			10 sec (approx.; at 20°C/68°F)			
Continuous copying			100 copies (max.)			
Copying speed			See Tale 1-1.			
Copy size			A4R/LGL (max.), business card (min.)			
Copy paper type	Cassette		Plain paper (64 to 80 g/m^2), tracing paper (SM-1), colored paper			
	Single manual feeding		Plain paper (52 to 128 g/m^2), tracing paper (SM1-1, GNT-80), OHP film*, colored paper*, postcard*, label sheet*, business card (200 g/m^2 or less, 51X88 mm /20X35 in. or more)			
	Multifeeder				Plain paper (52 to 128 g/m^2), tracing paper (SM-1), colored paper*, postcard*, business card (200 g/m^2 or less, 51X88 mm or more)	
	Two-sided/ overlay	Manual	Plain paper (60 to 128 g/m^2), colored paper*, postcard*, label sheet*, business card (200 g/m^2 or less, 51X88 mm /20X35 in. or more)			
Cassette			350 sheets, clawless, front loading, A4/LGL to A5/STM (universal)			
Multifeeder tray					5 mm /1.96 in. deep (approx.; about 0 sheets of 80 gm/^{2} paper)	
Copy tray			100 sheets (approx.; A4, 80 g/m^2 paper)			
Non-image width		Leading edge	2.0±1.5 mm /0.78±0.59 in. (two-sided/overlay/one-sided)			
		Left/right	2.5±1.5 mm /0.98±0.59 in. (two-sided/overlay/one-sided)			
Auto power off			Available (about 5 min; fixed)			

*As recommended by Canon.

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4. Others

Item		PC720	PC740	PC750	PC770
Operating environment	Temperature	7.5 to 32.5°C/45.5 to 90.5°F			
	Humidity	5 to 85%			
	Atmospheric pressure	810.60 to 1013.25hPa			
Power supply	115V60Hz, 220	Serial number	Serial number	Serial number	Serial number
Power consumption	Maximum	0.9 kW or less			
	Standby	0.2 W (approx.; about 5 min; reference only)			
	Copying	0.4 kWh (approx.; reference only)			
Noise	Standby	———			
	Copying	66 dB or less (sound power level under ISO)			
Ozone		0.01 ppm or less (average), 0.02 ppm or less (max.)			
Dimensions	Width	478.0 mm /18.8 in. (approx.)			
	Depth	438.0 mm /17.2 in. (approx.)			
	Height	290.0 mm /11.4 in. (approx.)			
Weight		20.0 kg /44.0lb (approx.; including cassette)			
Consumables	Copy paper	Keep wrapped to protect against humidity.			
	Toner	Avoid direct sunshine; keep at 40°C/85% or less.			

Reproduction ratio		Size	Copy paper	Model		
				PC770	PC740/750	PC720
DIRECT		A4R	A4R	12	10	8
		B5R	B5R	12	10	8
		A5R	A5R	12	10	8
REDUCE	I	A4R → A5R	A5R	12	10	8
	II	B5R → A5R	A5R	12	10	8
ENLARGE	I	A5R → A4R	A4R	9	7	6
	II	B5R → A4R	A4R	10	8	7

Table 1-101

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		Serial number	Serial number	Serial number	Serial number
Power supply	100V				LCD xxxxx
	115V			NDB xxxxx	NDC xxxxx
	220/240V				PBC xxxxx

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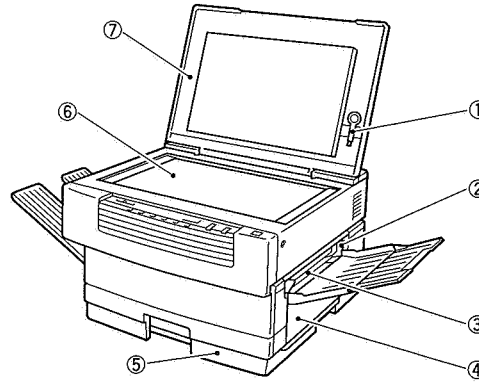
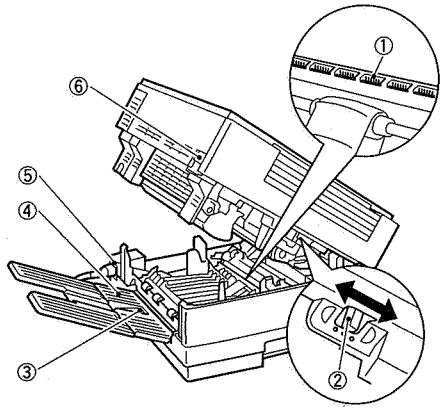
III. NAMES OF PARTS

A. External View



① Static eliminator cleaner
② Slide guide
③ Multifeeder/Singlefeeder
④ Right door
⑤ Cassette
⑥ Copyboard glass
⑦ Copyboard cover

Figure 1-301



① Static eliminator
② Copy density correction switch
③ Delivery guide plate
④ Copy tray
⑤ Power cord connector
⑥ Open/close lever

Figure 1-302

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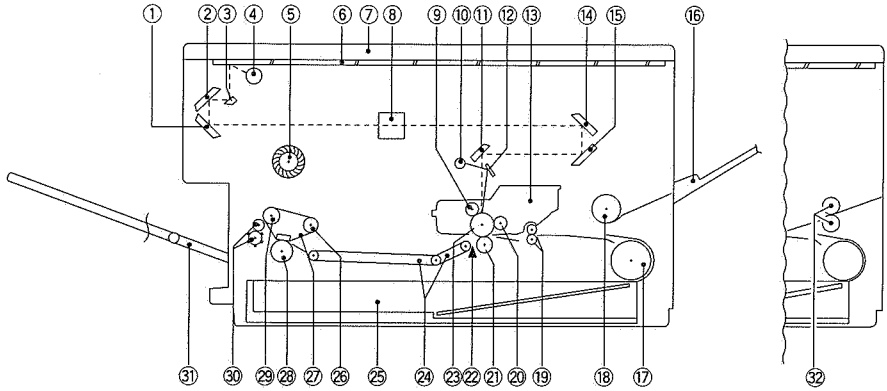
B. Cross Section



① No. 3 mirror
② No. 2 mirror
③ No. 1 mirror
④ Scanning lamp
⑤ Heat exhausting fan
⑥ Copyboard glass
⑦ Copyboard cover
⑧ Lens array
⑨ Primary charging roller
⑩ Blank exposure lamp
⑪ No. 6 mirror
⑫ Reflecting plate
⑬ Cartridge
⑭ No. 4 mirror
⑮ No. 5 mirror
⑯ Pick-up tray
⑰ Cassette pick-up roller
⑱ Multiple pick-up roller (PC750/770)
⑲ Registration roller
⑳ Developing cylinder
㉑ Transfer roller
㉒ Static eliminator
㉓ Photosensitive drum
㉔ Feeding assembly
㉕ Cassette
㉖ Film tension roller
㉗ Fixing film
㉘ Lower fixing roller
㉙ Film drive roller
㉚ Delivery roller
㉛ Copy tray
㉜ Single feeder roller (PC720/740)

Figure 1-303

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IV. OPERATIONS

A. Control Panel

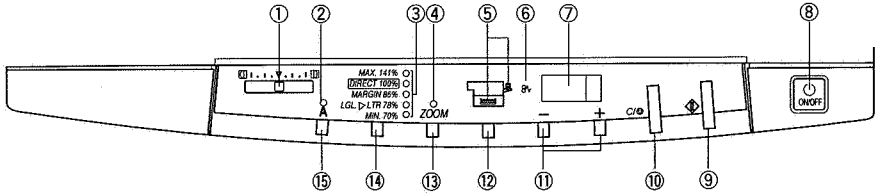

Figure 1-401a (Inch-configuration)

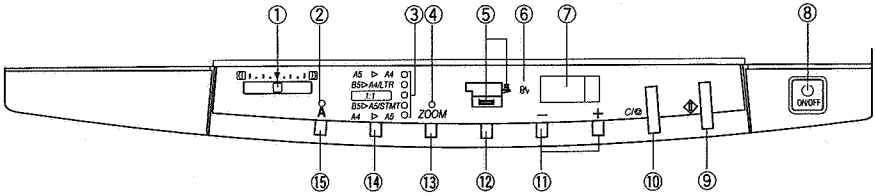

Figure 1-401b (AB/Inch-configuration)

Ref.	Name	Description	Remarks
1	Copy Density Adjust lever	Use it to manually adjust the copy density.	
2	AE indicator	Turns on when AE is selected.	
3	Ratio indicator	Indicates the selected reproduction ratio.	
4	ZOOM indicator	Turns on when zoom mode is selected.	
5	Paper Select/ Add Paper indicator	• Indicates the selected cassette or multifeeder. • Flashes when paper runs out.	
6	Jam indicator	Flashes when a jam occurs.	
7	Copy Count/ Ratio indicator	Indicates the copy count or reproduction ratio.	100 (max.; continuous copying)
8	Power switch	Turns on and off the power.	
9	Copy Start key	Starts copying.	
10	Clear/Stop key	Stops copying or returns the copy mode to default*.	*Default Mode Reproduction ratio: 100% Copy count: 1 Paper select: cassette Copy density: AE

Table 1-401a

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Ref.	Name	Description	Remarks
11	Copy Count/ Zoom Set key	Sets a copy count or a reproduction ratio.	
12	Paper Select key	Selects the cassette as the source of paper or Selects the multifeeder.	
13	Zoom Mode key	Selects or deselects zoom mode.	
14	Default Ratio key	Selects a default reproduction ratio.	May be between 70% and 141% in 1% increments.
15	AE key	Selects or deselects AE mode.	

Table 1-401b

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B. Basic Copying Operations

1) Turn on the power switch.
   - The wait time is 0 sec.
   - The auto power-off mechanism becomes activated to automatically turn off the power if no key is operated in about 5 min.
2) Lift the copyboard cover, and place an original face down along the size index.
   a. Place the original so that its center is aligned against the arrow (→); then, bring down the copyboard cover.

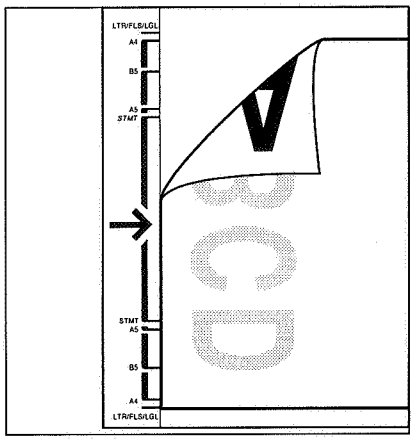
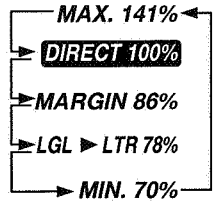
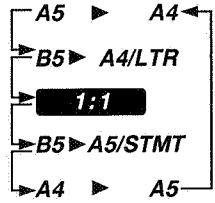


Figure 1-402

3) If you need to manually adjust the copy density, deselect AE and use the Copy Density Adjust lever.
4) As necessary, press the Default Ratio key or Zoom key.
   a. When you press the Zoom key, '%' appears on the Copy Count/Ratio indicator so that you may set the ratio between 70% and 141% in 1% increments.
   '%' disappears if the Copy Count/Ratio key is not operated in about 2 sec.
   b. When you press the Default Ratio key, the ratio changes as follows for each press:



(Inch- configuration)



(AB/Inch- configuration)

5) If you are using the multifeeder, press the Paper Select key.
6) Check that the '%' notation on the Copy Count/Ratio indicator has turned off; then, set the number of copies to make using the Copy Count/Zoom Set key. (The count should appear on the Copy Count indicator.)
7) Press the Copy Start key.
   a. As may copies as you have specified will be made automatically.
   b. No other keys than the Clear/Stop key or Copy Density adjustment lever will be accepted until the last copy has been made.
   c. You may switch from automatic density adjustment mode to manual density adjustment mode between copying has started and the last copy is made; however, you cannot switch from manual density adjustment mode to automatic density adjustment.
   d. When copying is finished, the Copy Count indicator indicates the initial copy count. If copying stopped as a result of the absence of paper, a press on the Copy Start key after supplying paper will automatically make the remaining number of copies.

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e. To stop copying operation during continuous copying, press the Clear/Stop key; the ongoing copy run is finished before the operation stops. (At this time, the Copy Count indicator indicates the initial count.)
f. If paper jams, the JAM indicator will flash and copying operation stops; open the top unit. (The power turns off when the top unit is opened for removal of the jam.)
g. After copying operation is over, the auto power-off mechanism becomes activated if the copier is left alone for about 5 min without further key operation, automatically turning off the power.

1.1 Using Transparencies (PC720/740)

1) Shift the delivery guide plate on the copy tray upright.

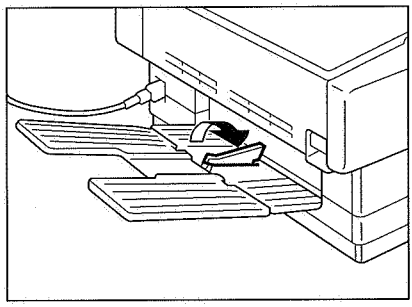
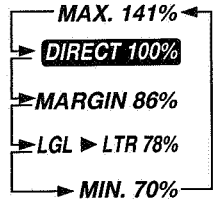
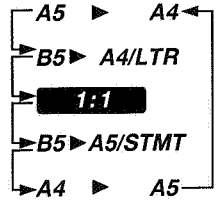


Figure 1-403

2) Place an original on the copyboard, and close the copyboard cover.
3) If you want to manually adjust the copy density, deselect AE, and operate the Copy Density Adjust lever.
4) Press the Default Ratio key or Zoom Mode key to suit the reproduction ratio you want.
   a. When you press the Zoom key, you may set the ratio between 70% and 141% in 1% increments.
   b. When you press the Default Ratio key, the ratio changes as follows for each press:



(Inch- configuration)



(AB/Inch- configuration)

5) Place a single transparency on the singlefeeder.
   • You must not set more than one transparency on the singlefeeder.
6) Select the multifeeder using the Paper Select key.
7) Set the copy count you want using the Copy Count/Zoom Set key; then, check the Copy Count indicator.
8) Press the Copy Start key.
   • Be sure to remove each transparency delivered to the copy tray before the next one is delivered.

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If the Transparency Is Not Picked Up Smoothly

- Under certain environmental conditions, transparencies may fail to move into the machine in response to a press on the Copy Start key. If this is the case, go through the following:

1) Place copy paper underneath the transparency with a displacement of about 1 cm.

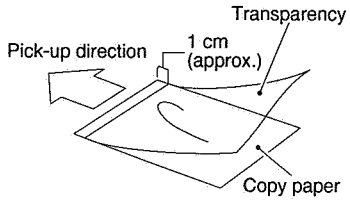


Figure 1-404

2) Set the transparency together with the copy paper on the multifeeder while holding the trailing edge of the copy paper.
3) Press the Copy Start key while still holding the trailing edge of the copy paper; hang on to the copy paper, and remove it when the transparency has disappeared into the machine.

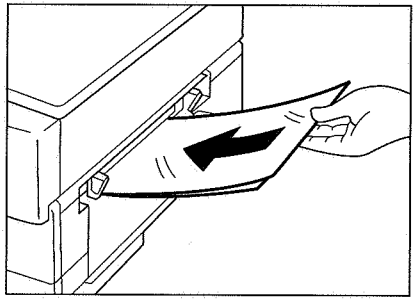


Figure 1-405

1.2 Using Transparencies (PC750/770)

1) Shift the delivery guide plate on the copy tray upright.

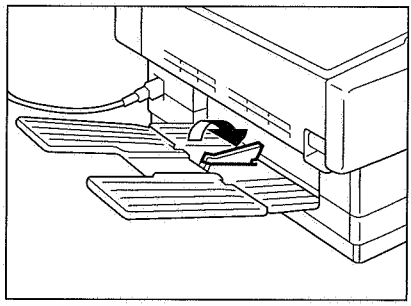
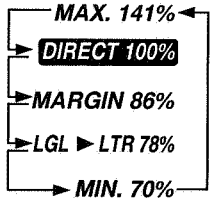
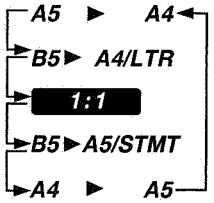


Figure 1-406

2) Place an original on the copyboard, and close the copyboard cover.
3) If you want to manually adjust the copy density, deselect AE, and operate the Copy Density Adjust lever.
4) Press the Default Ratio key or Zoom Mode key to suit the reproduction ratio you want.
   a. When you press the Zoom key, you may set the ratio between 70% and 141% in 1% increments.
   b. When you press the Default Ratio key, the ratio changes as follows for each press:



(Inch- configuration)



(AB/Inch- configuration)

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5) Place a single transparency on the singlefeeder.
   - You must not set more than one transparency on the singlefeeder.
6) Select the multifeeder using the Paper Select key.
7) Set the copy count you want using the Copy Count/Zoom Set key; then, check the Copy Count indicator.
8) Press the Copy Start key.
   - Be sure to remove each transparency delivered to the copy tray before the next one is delivered.

If the Transparency Is Not Picked Up Smoothly

- Under certain environmental conditions, transparencies may fail to move into the machine in response to a press on the Copy Start key. If this is the case, go through the following:

1) Place copy paper underneath the transparency with a displacement of about 1 cm.

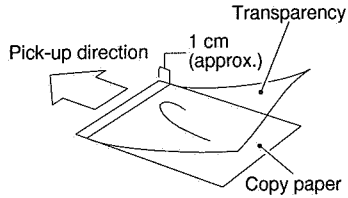

Figure 1-407

2) Set the transparency together with the copy paper on the multifeeder while holding the trailing edge of the copy paper.
3) Press the Copy Start key while still holding the trailing edge of the copy paper; hang on to the copy paper, and remove it when the transparency has disappeared into the machine.

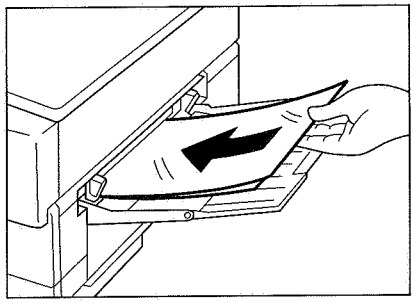

Figure 1-408

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2. Making Two-Sided/Overlay Copies

You can make two-sided/overlay copies using the multifeeder; however, you must keep the following in mind:

① Two-Sided Copies
After the first copy run, turn over the copy paper and set it as shown in Figure 1-409

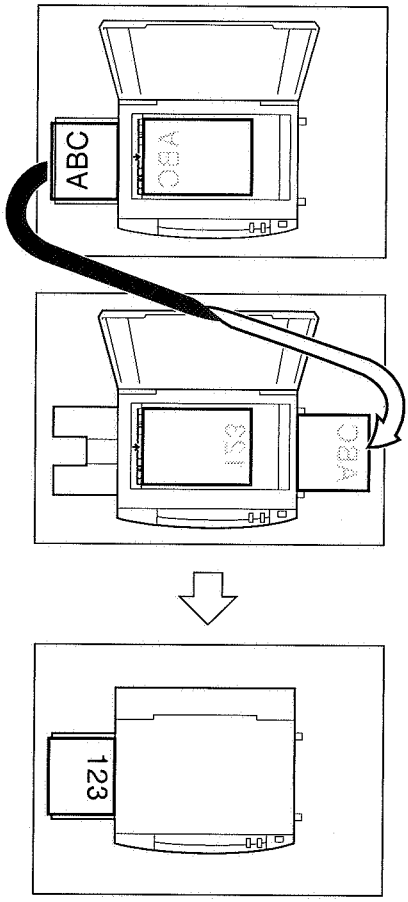

Figure 1-409

② Overlay Copies
Set the first and second originals so that the leading edges of both are positioned in the same way.

③ Make sure the paper is not moist.

④ Make sure that the paper is not curled.

⑤ Make sure that the paper is of 60 to 128 g/m2 (business card, 200 g/m2 or less).

⑥ In the case of a two-sided copy, each side may not be used more than once.

⑦ In the case of an overlay copy, only one side may be used.

⑧ After the first copy run, cool the paper sufficiently and remove the curl before feeding it for the second copy run.

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C. Removing Jams

The Jam indicator flashes to indicate the presence of a jam inside the machine.

① Remove the jam with care so as not to tear it. Be sure to remove all pieces of paper if it has torn.

1) Check the multifeeder for a jam. To remove, pull the paper slowly out of the multifeeder.
2) Open the right cover, and check if there is copy paper. Remove the paper if found.
3) Shift the open/close lever to open the body.

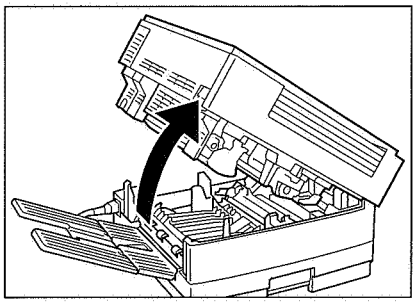

Figure 1-410

4) Pull out any jam from inside the machine with care.

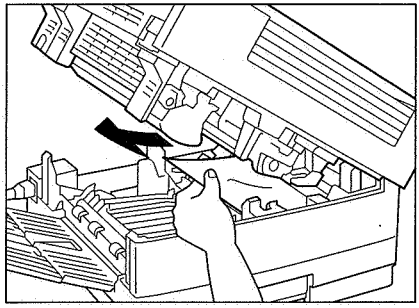

Figure 1-411

D. Adding Paper

The Add Paper indictor 'P' turns on in response to the following conditions:

① When the cassette has run out of paper.
② When the Copy Start key is pressed without setting the cassette in the cassette holder.
③ When the Copy Start key is pressed without paper on the multifeeder.

1) Check if paper is set in the cassette.
2) If the cassette is out of paper, set copy paper.
   If there is paper in the cassette, go through the following:
   ① Open the right door, and check if there is a jam. Remove it if any.
   ② Take out the stack of paper from the cassette, put the sheets in order, and set the stack back in.
   ③ Make sure that the cassette is properly set in the cassette holder.
3) Press the Copy Start key.
   ① The 'P' indication should go off, and the copier will make the remaining number of copies.

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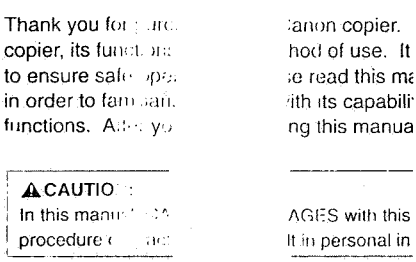
E. Replacing the Cartridge

1. When to Replace the Cartridge

When the cartridge starts to run out of toner, the copy image will tend to have white lines or white spots; see Figure 1-409.


Preface

Thank you for ... anon copier.
copier, its func... hod of use. It
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in order to fam...iar... ith its capabili
functions. A... yo... ng this manua

⚠CAUTIO...
In this manu... AGES with this
procedure c... lt in personal in

Figure 1-412

Go through the following:

1) Remove the cartridge from the copier, and rotate it several times as shown in Figure 1-410.

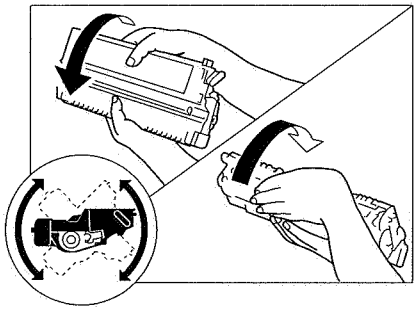

Figure 1-413

2) Set the cartridge in the copier, and make a copy.

a. If the copy image has returned to normal,
   - Advise the user that, although he/she may continue to use the cartridge, a new cartridge should be obtained.

b. If the copy image fails to return to normal,
   - Replace the cartridge according to the instructions under "2. Replacing the Cartridge."

2. Replacing the Cartridge

1) Shift up the open/close lever to open the body.

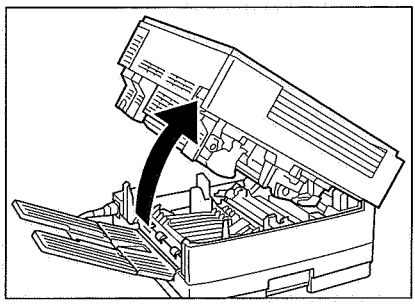

Figure 1-414

2) Slide the old cartridge out of the copier.

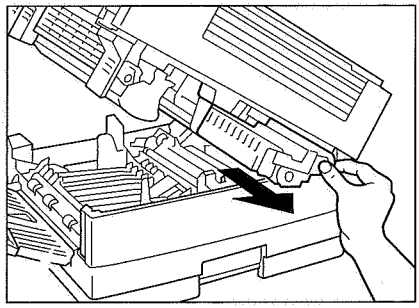

Figure 1-415

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3) Take out the new cartridge from its bag, and hold it horizontally with the warning label facing up; then, rotate it about 90° several times.

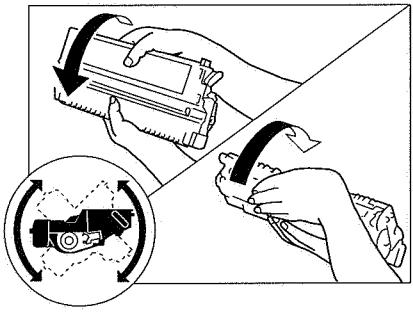

Figure 1-416

4) Peel the end of the Open seal of the cartridge, and pull it straight out toward the front (about 50 cm).

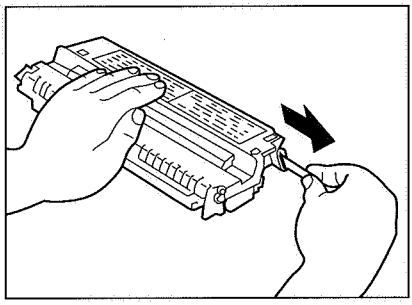

Figure 1-417

5) Hold the cartridge with the Open label facing up, and insert it into the copier slowly until it stops.

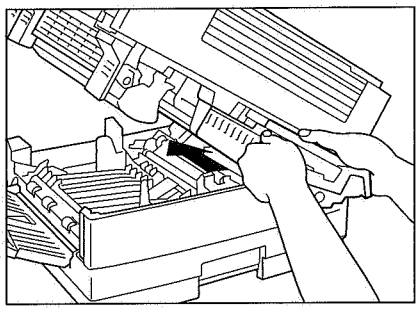

Figure 1-418

6) Press down on the mark on the copier's top to close the body.

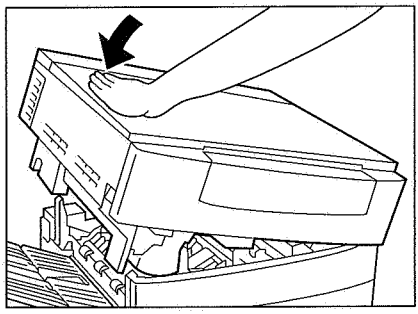

Figure 1-419

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F. Using the Density Correction Switch

If the copy density is too high, i.e., the image is too dark, in density adjustment mode (AE or manual), you may switch among three copy density settings using the Density Correction switch.

1) Shift up the open/close lever to open the body.
2) Change the position of the density correction switch.

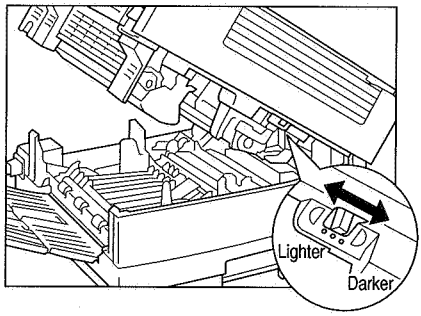

Figure 1-420

G. Cleaning

If the images tend to be soiled or copy paper tends to jam frequently, advise the user to clean the following parts:

1. If Images Are Soiled

a. Copyboard Glass/Copyboard Cover

Wipe it with a moist cloth; then, dry wipe it. If the dirt cannot be removed, wipe it with a cloth moistened with mild detergent solution, and dry wipe it.

b. Cassette Pick-Up Roller

1) Remove the cassette.
2) Open the right cover.
3) Keep the separation pad down, wipe the cassette pick-up roller with a cloth moistened with alcohol or water* while rotating the roller in the direction of pick-up.
*Be sure to wring it well.

Caution:
Do not make copies until the cassette pick-up roller has dried completely.

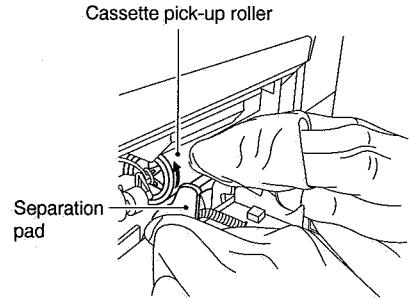

Figure 1-421

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c. Multi Pick-Up Roller

1) Lift the open/close lever to open the body.
2) Place one sheet of copy paper (A4) in the feeding path.
3) Keep the separation pad down, and wipe the multi pick-up roller with a cloth moistened with alcohol or water* while rotating the multi pick-up roller in the direction of pick-up.
   *Be sure to wring it well.

Caution:
Do not make copies until the multi pick-up roller has dried completely.

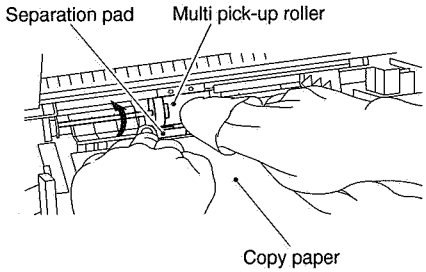

Figure 1-422

2. Frequent Jams

a. Static Eliminator

1) Open the copyboard cover, and remove the static eliminator cleaner.

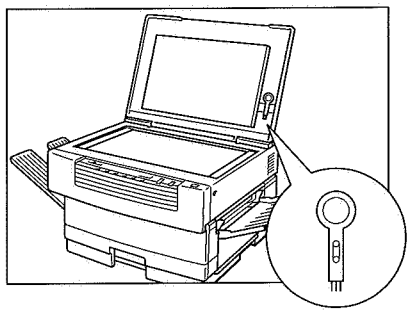

Figure 1-423

2) Shift up the open/close lever to open the body.
3) Clean the static eliminator with the static eliminator cleaner.
   ① Brush out any dirt (paper lint, for example) from the groove in the static eliminator.

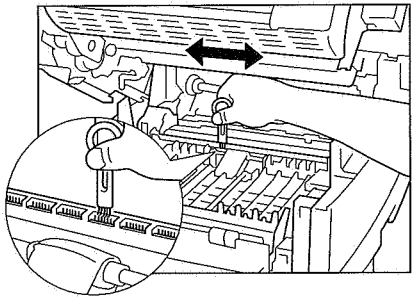

Figure 1-424

4) Close the body as soon as you have finished cleaning.

CHAPTER 2
COPYING PROCESS

I. IMAGE FORMATION..... 2-1 II. AUXILIARY PROCESS 2-8

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I. IMAGE FORMATION

A. Outline

The copier uses a direct charging/transfer system with each component block arranged as shown in Figure 2-101.

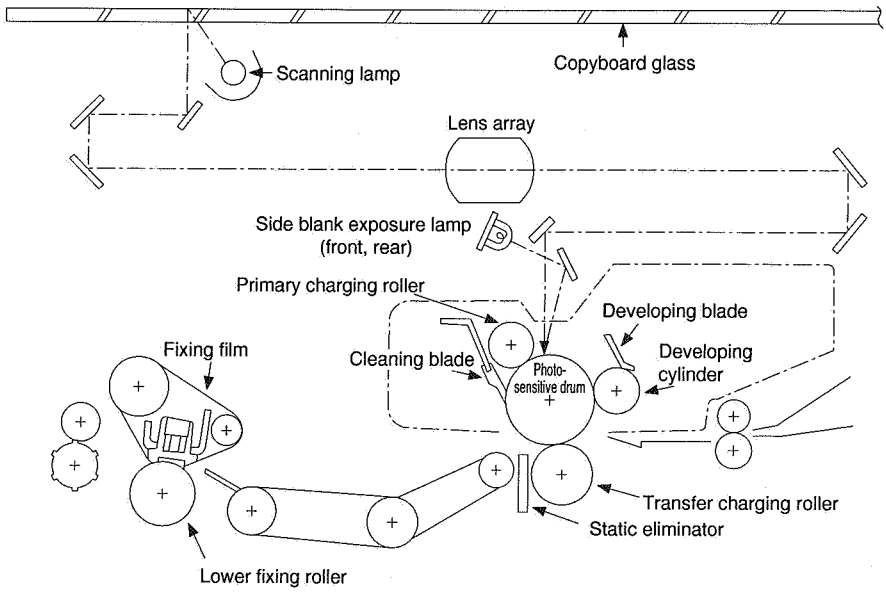

Figure 2-101

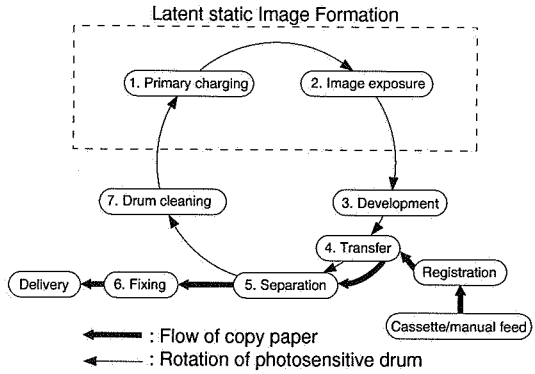

Figure 2-102

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The copier's image formation block consists of the following steps; see the descriptions for each step given under its respective heading:

Step 1: primary charging (-)
Step 2: image exposure
Step 3: development (AC + DC bias)
Step 4: transfer (-)
Step 5: separation (+)
Step 6: fixing
Step 7: drum cleaning

The photosensitive drum consists of two layers: the outer layer being a photoconductive layer made of organic photoconductor (OPC) and inner layer, a substrate made of aluminum (conductor).

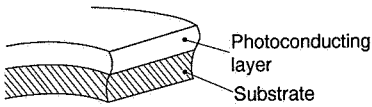

Figure 2-103

B. Static Latent Image Formation Block

The static latent image formation block consists of tow steps: primary charging and image exposure. At the end of this block, the areas on the photosensitive drum corresponding to the black areas of the original are left with negative charges and those corresponding to the white areas of the original are rid of negative charges.

These images created by negative charges are not visible to the human eye and, therefore, are called static latent images.

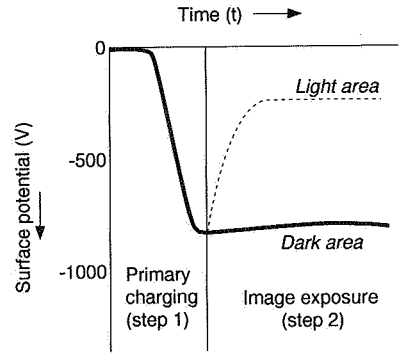

Figure 2-104

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C. Primary Charging (step 1)

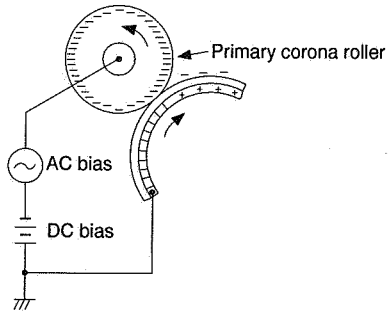

Figure 2-105

The surface of the photosensitive drum is charged to a uniform negative potential in preparation for the formation of static latent images.

The copier uses its primary charging roller to directly charge the photosensitive drum (primary charging).

The primary charging roller is made of conducting rubber, and an AC bias is applied to the roller in addition to a DC bias.

An AC bias serves to keep the surface potential of the photosensitive drum uniform, eliminating the need for pre-exposure.

The DC bias applied simultaneously with the AC bias, on the other hand, serves to maintain primary potential.

Reference:

A direct charging system provides such advantages as low application voltage and generates little, if any, ozone.

D. Image Exposure (step 2)

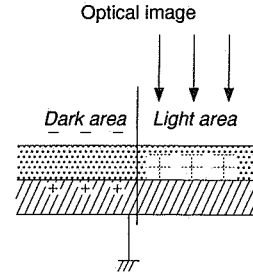

Figure 2-106

In this step, the optical image of the original is projected to the photosensitive drum to neutralize the charges in the light area.

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E. Development (step 3)

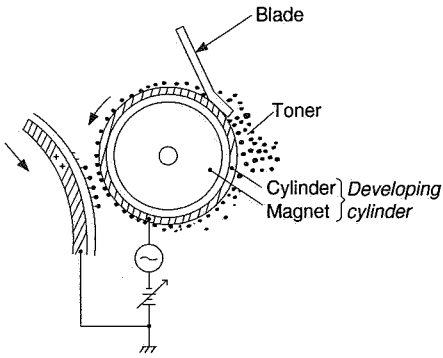

Figure 2-107 (developing assembly)

As shown in Figure 2-107, the developing assembly consists of a rubber blade and a developing cylinder constructed of a fixed magnet and a cylinder that rotates around it. The copier's toner is a one-component toner (for both black and color) made mostly of magnetite and resins. The toner has insulating characteristics and becomes positively charged by the friction between the rotating cylinder and the blade.

The depositing roller collects toner around the blade and serves to scrape residual toner from the developing cylinder. (See Figure 2-108.)

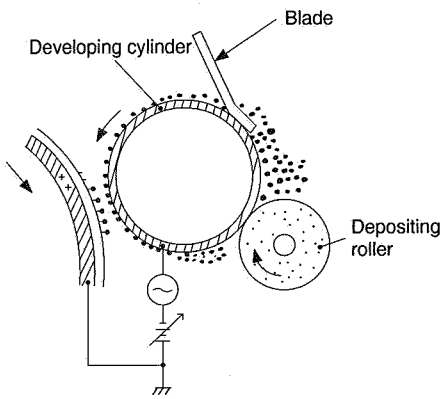

Figure 2-108

The toner is moved between the rotating developing cylinder and a blade, where it is charged to a positive potential and deposited on the developing cylinder in a thin, uniform layer.

The developing cylinder receives both AC bias and DC bias (negative component) at the same time; the resulting bias is called *developing bias.* For this reason, the negative component of the developing bias is greater than the positive component.

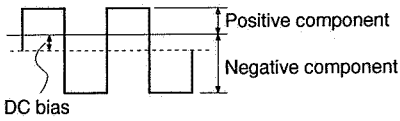

Figure 2-109

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During copying, the toner is attracted to the photosensitive drum by the photosensitive drum surface potential and the development bias (positive component), thus turning the static latent image into a visible image. Any excess toner is repelled by the photosensitive drum by the photosensitive drum surface potential and the developing bias (negative component).

A DC bias affects copy density and the degree of fogging; the higher, i.e., closer to 0 V, it is, the darker the images will be—however, with an increased tendency toward fogging.

F. Transfer (step 4)

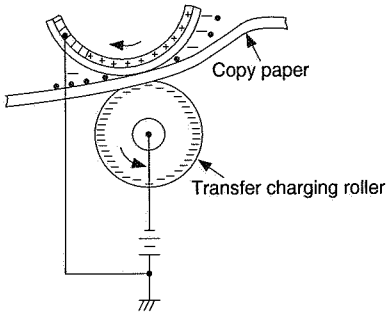

Figure 2-110

A negative voltage is applied to the back of copy paper to transfer toner from the surface of the transfer drum to the copy paper.

The copier uses a roller transfer system, which has the following advantages when compared with the conventional corona transfer system:

- Generates virtually no ozone.
- Provides good feeding, since copy paper is retained by both the transfer charging roller and the photosensitive drum.

Reference:

Toner may collect on the transfer roller if the image on the photosensitive drum fails to transfer to the copy paper because of a jam or the like.

The copier turns the transfer voltage to positive during initial rotation, while the scanner is moving in reverse, and during post rotation to return the positively charged toner adhering to the transfer roller to the photosensitive drum.

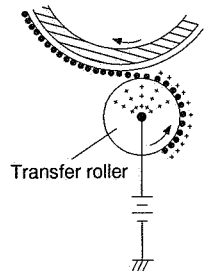

Figure 2-111

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G. Separation (step 5)

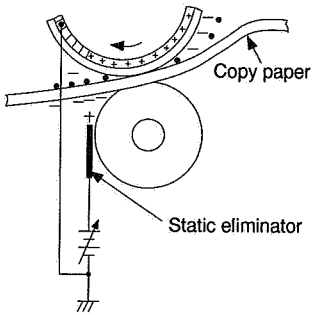

Figure 2-112

Copy paper is separated from the photosensitive drum using the rigidity of the paper. Thin paper, however, has low rigidity and can wrap around the photosensitive drum. To prevent such a problem, the copier applies a positive voltage to the separation static eliminator to weaken the static attraction between the photosensitive drum and copy paper, thereby facilitating separation.

H. Fixing (step 6)

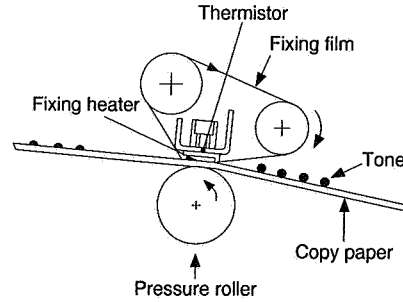

Figure 2-113

After transfer, the toner image is fixed to the paper while the copy paper moves through the fixing film and the pressure roller.

The fixing film has a seamless construction and is made of special material so that melting toner will not stick to the film—this is why the copier's fixing assembly does not have a cleaning mechanism.

The fixing heater is a flat heater and heats only the area where the fixing film comes into contact; this design eliminates the need for warm-up time.

The temperature of the fixing heater is monitored by the thermistor (TH1) located more or less at the center of the fixing heater and serves to make sure that the heater is controlled to a specific temperature.

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I. Drum Cleaning (step 7)

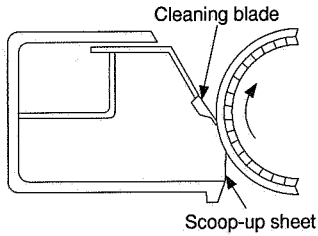

Figure 2-114

In preparation for the next copy run, the cleaning blade scrapes off the residual toner from the photosensitive drum by way of cleaning the photosensitive drum surface. The scoop-up sheet then is used to collect such toner.

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II. AUXILIARY PROCESS

1. Side Blank Exposure

Side blank exposure is used to prevent adhesion of excess toner to the drum by removing the residual potential in the non-image areas of the drum. See p. 3-35 for details.

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CHAPTER 3

OPERATIONS AND TIMING

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I. BASIC OPERATION

A. Functional Construction

The copier can roughly be divided into four functional blocks: namely, pick-up/feeding, exposure, image formation, and control.

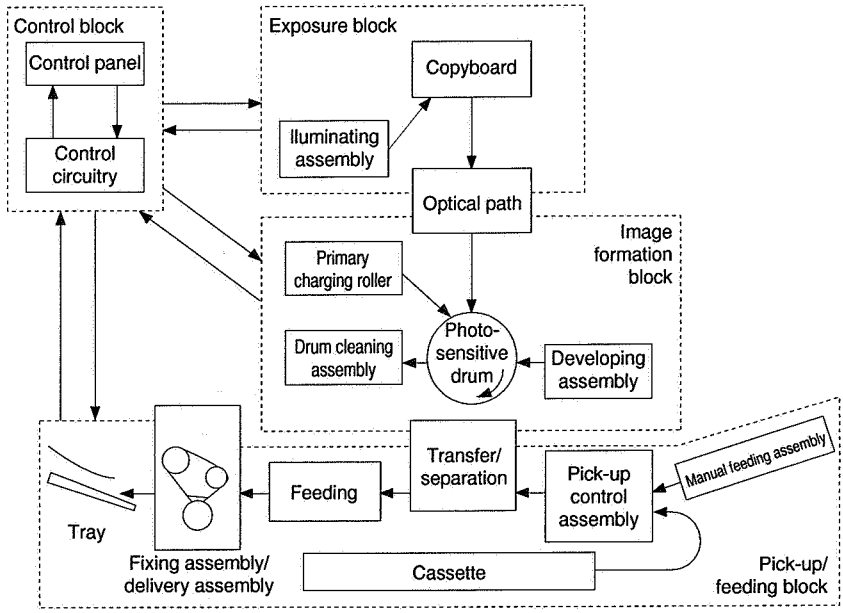

Figure 3-101

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B. Electrical Circuitry

The copier's major electrical control mechanisms are driven by the microprocessor on the DC controller PCB. The microprocessor reads input signals from the sensors and the operation keys in response to the instructions of the program stored in advance and generates signals used to drive such loads as motors, solenoids, and lamps.

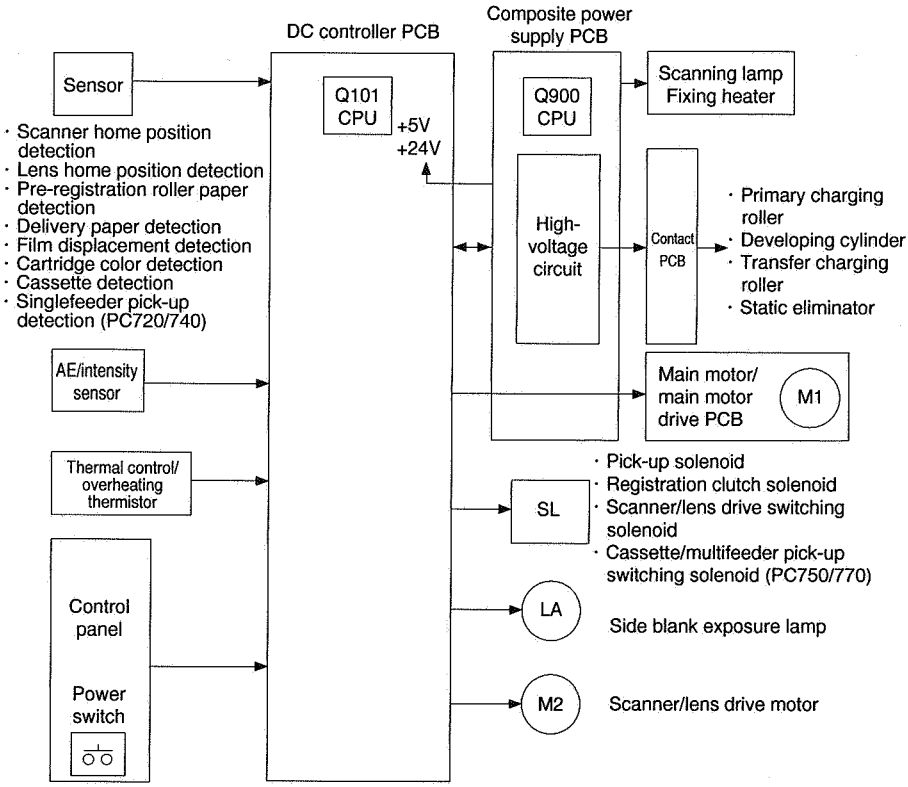

Figure 3-102

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C. Inputs to and Outputs from the DC Controller

1. Inputs to the DC Controller (1/2)

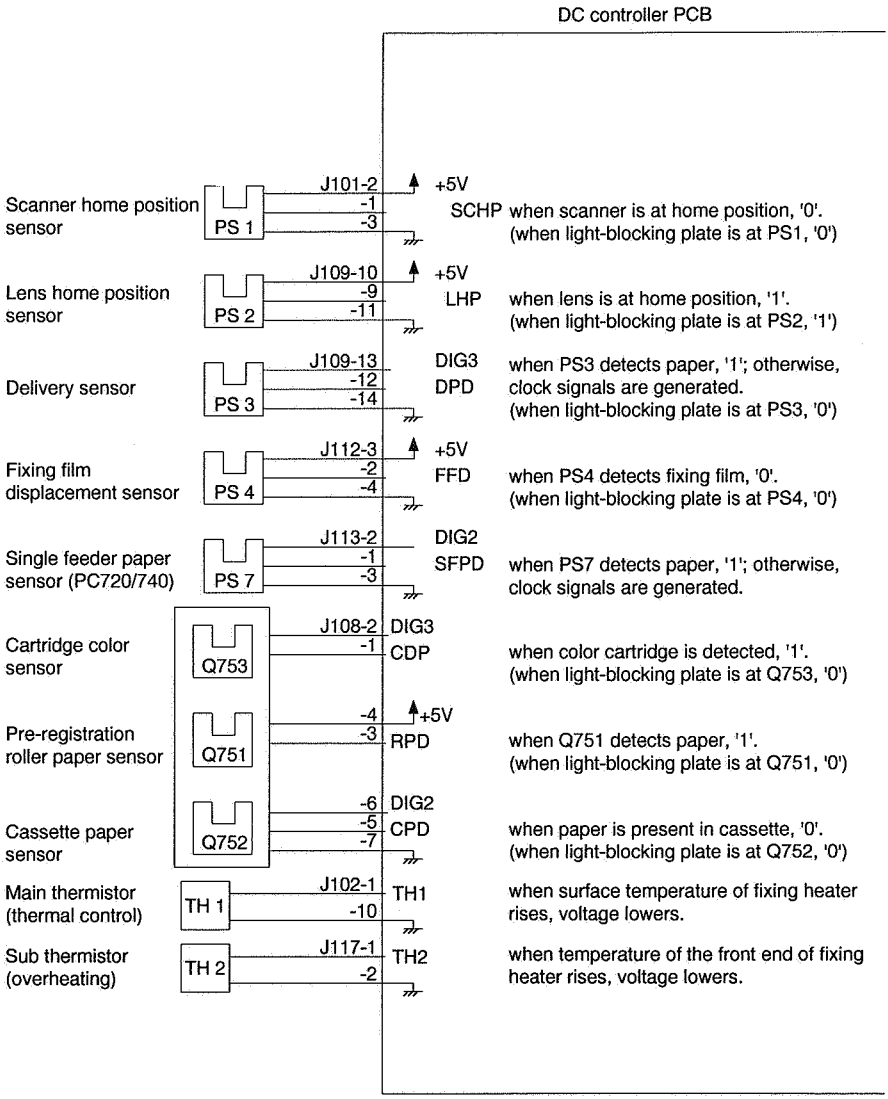

Figure 3-103

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2. Inputs to the DC Controller (2/2)

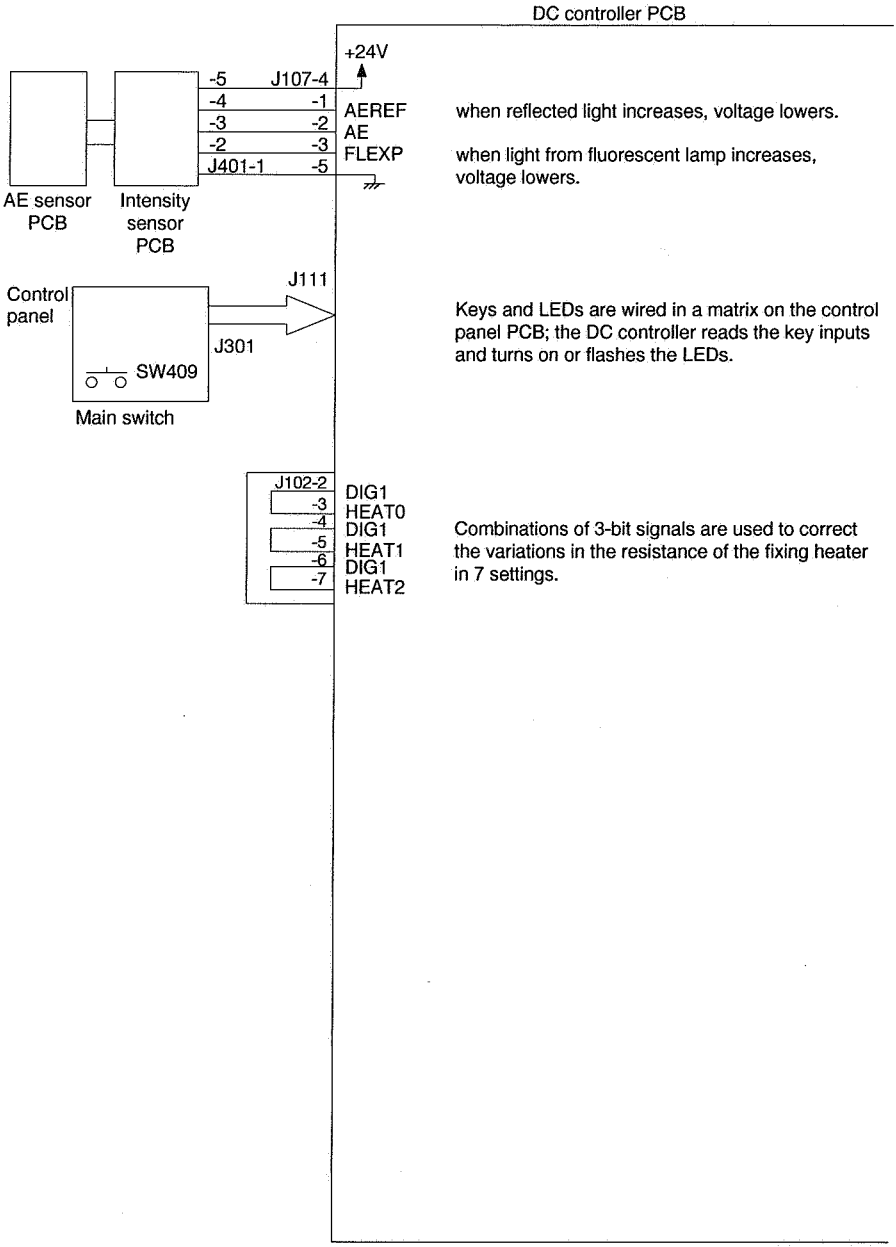

Figure 3-104

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D. Outputs from the DC Controller

1. Outputs from the DC Controller(1/2)

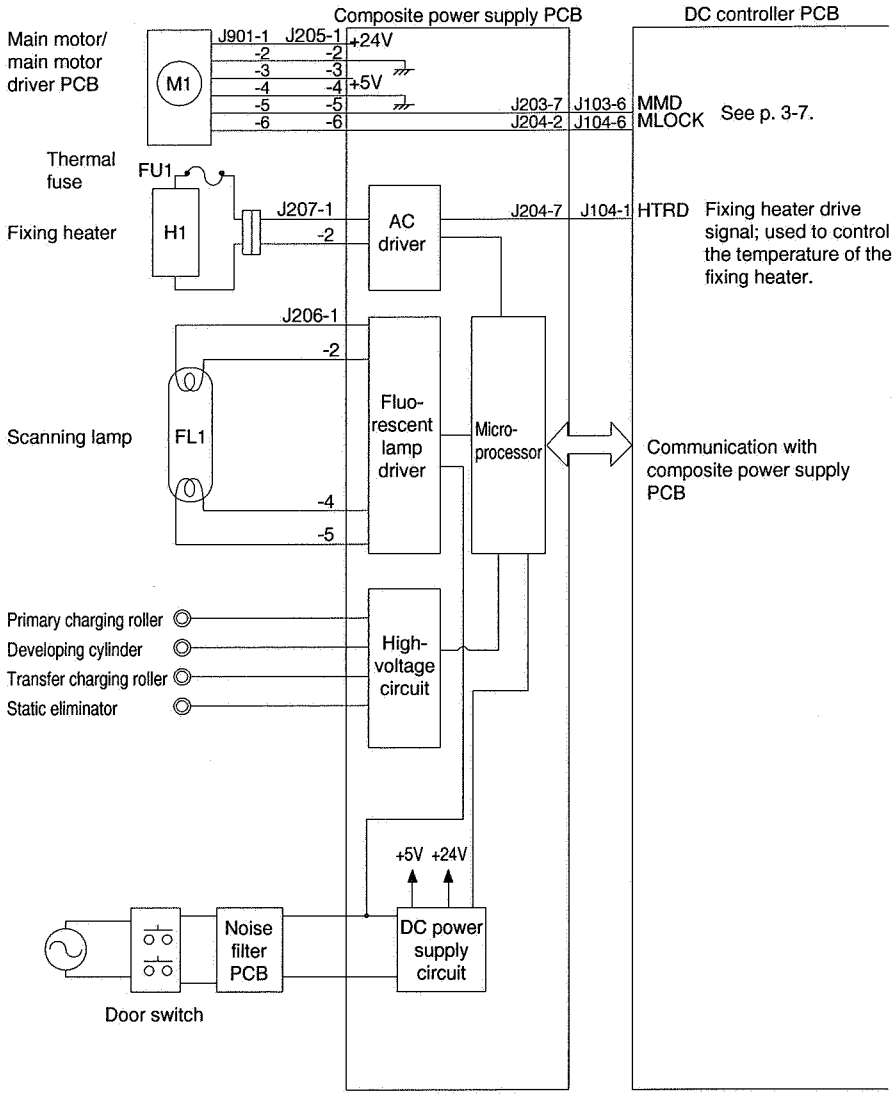

Figure 3-105

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2. Outputs from the DC Controller (2/2)

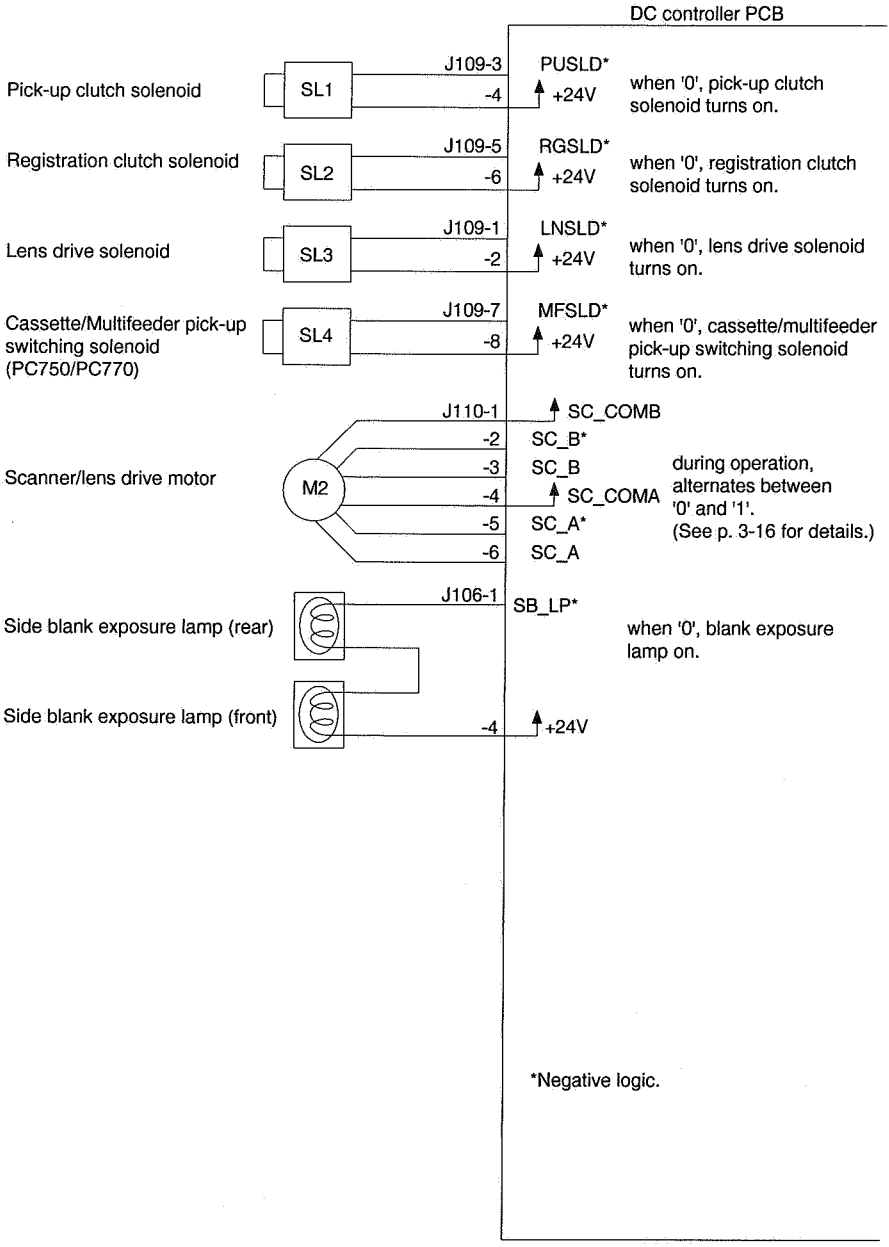

Figure 3-106

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E. Main Motor Control Circuit

1. Outline

Figure 3-107 shows the circuit that controls the main motor (M1); the circuit has the following functions:

① turns on and off the main motor.
② controls the rotation of the main motor to a specific revolution.

The main motor (M1) is a DC motor with a built-in clock pulse generator. When the motor rotates, clock pulse signals (MMCLK) are generated according to the revolution of the motor. The speed control circuit matches the phases of the frequency of these clock pulses and the frequency of the reference signal to control the rotation of the main motor (M1) to a specific revolution.

2. Operation

When the main motor drive signal (MMD) from the DC controller circuit goes '1', the drive circuit of the motor driver turns on, thereby rotating the main motor (M1) at a specific revolution.

While the main motor is rotating at a specific revolution, the motor driver PCB sends the speed state signal (MLOCK=0) to the DC controller PCB. If, for some reason, fluctuations occur in the rotation of the main motor, the MLOCK signal goes '1'.

If MLOCK=1 continues about 1 sec while the main motor drive signal (MMD) is '1', the DC controller identifies an error in the main motor, stops the main motor and, at the same time, indicates 'E010' on the display.

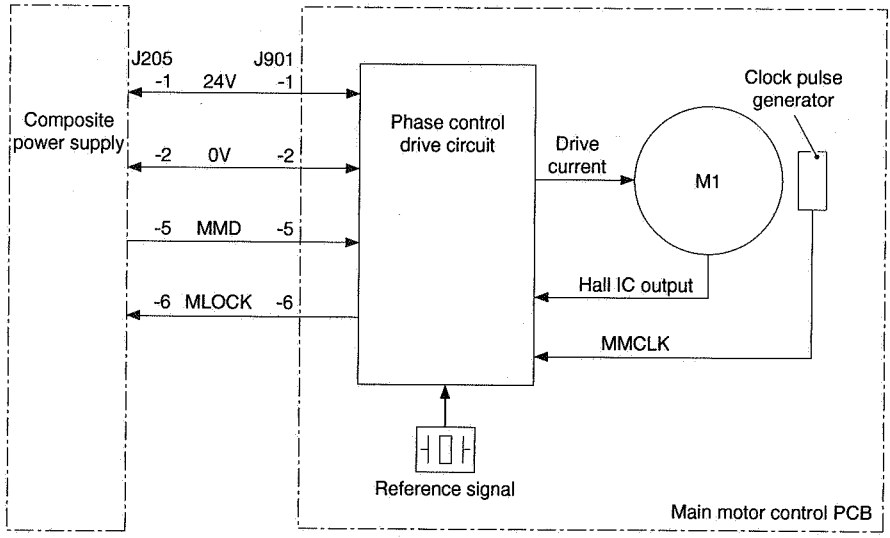

Figure 3-107

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F. Basic Sequence of Operations (DIRECT, 2 copies, continuous)

1. Copy Start Key On 3.2 Sec (approx.) After Power-On

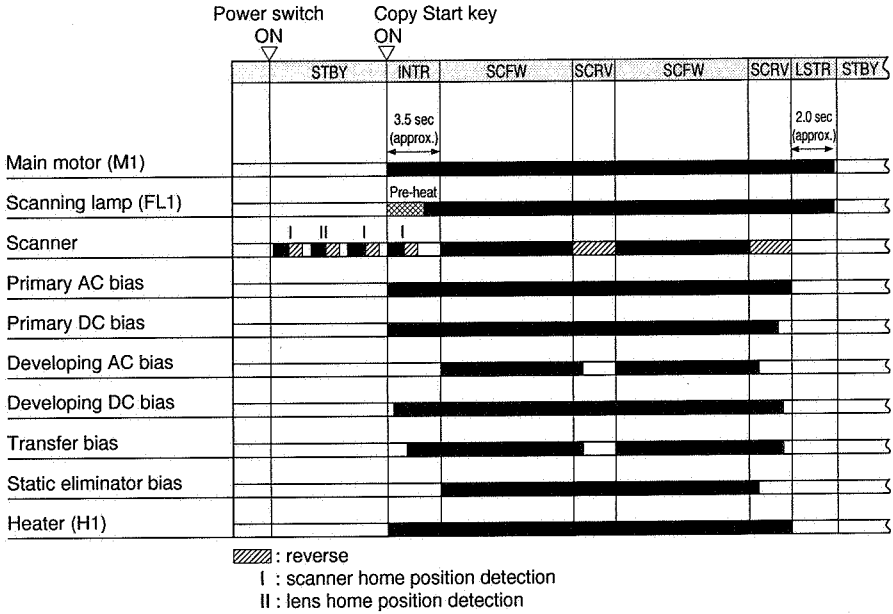

Figure 3-108

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2. Copy Start Key On Immediately After Power-On (less than 3.2 sec)

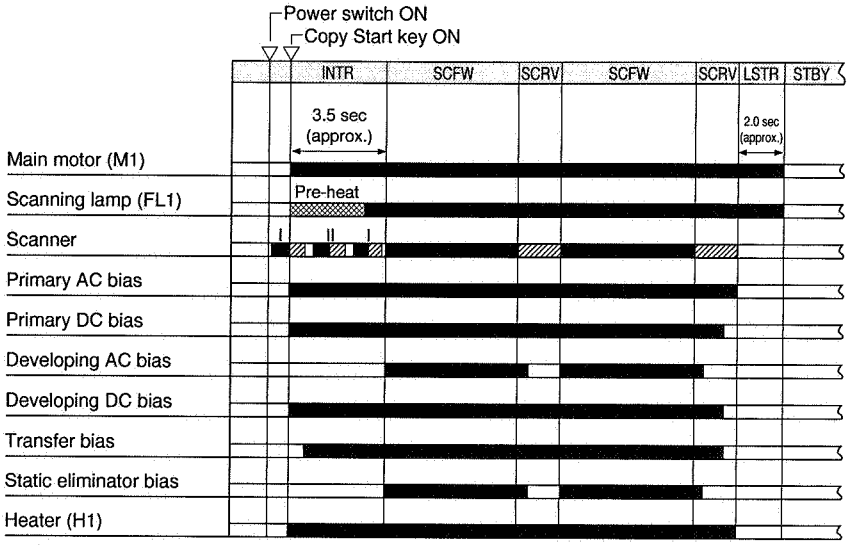

Figure 3-109

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	Period	Description	Remarks
STBY (standby)	• Between when the power switch is turned on and when the Copy Start key is pressed. • Between when LSTR is over and when the Copy Start key is pressed.	Waits until the Copy Start key becomes valid.	
INTR (initial rotation)	For about 3.5 sec after the Copy Start key is pressed.	• Removes the residual charges from the photo-sensitive drum and stabilizes the sensitivity of the photo-sensitive drum in preparation for cpying operation. • Pre-heats the scanning lamp and makes preparations until the drive intensity becomes stabilized.	The pick-up signal is generated, and the first sheet of copy paper is picked up.
SCFW (scanner forward)	While the scanner is moving forward. • The distance traveled forward varies depending on the copy paper size and reproduction ratio. • The speed of forward travel varies depending on the reproduction ratio.	The scanning lamp illuminates the original, and the reflected optical image is projected on the photosensitive drum by way of mirrors and lenses.	The registration signal is generated, and the copy paper is moved to the transfer assembly.
SCRV (scanner reverse)	While the scanner is moving in reverse. • The speed of reverse travel is about 3.4 times as fast as forward travel in DIRECT.	The scanner is returned to the home position in preparation for the next copy run.	If in continuous mode, the pick-up signal is generated, and copy paper is picked up.
LSTR (last rotation)	For about 1 sec after SCRV for the last copy is over.	The last copy paper is discharged.	

Table 3-101

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II. EXPOSURE SYSTEM

A. Varying the Reproduction Ratio

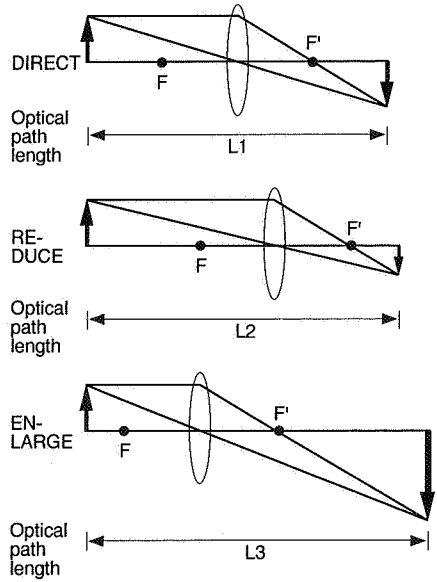
The reproduction ratio in the direction of the drum axis is varied by the lens drive system and that around the drum, by the scanner drive system.

The lens drive system holds a lens array and changes the location of the lens and the optical path length as shown in Figure 3-201 to vary the reproduction ratio in the direction of the drum axis; the length of the optical path is changed by moving the No. 4 and No. 5 mirror units as shown in Figure 3-202.

The scanner drive system changes the reproduction ratio around the drum by moving the No. 1 mirror faster (reduction) or slower (enlargement) relative to the peripheral speed of the drum.

Reference:

1. In DIRECT, the speed at which the No. 1 mirror is moved is the same as the peripheral speed of the drum.
2. The length of the optical path is longer in both REDUCE and ENLARGE than in DIRECT.



Optical path: L1< L2, L1< L3

Figure 3-201

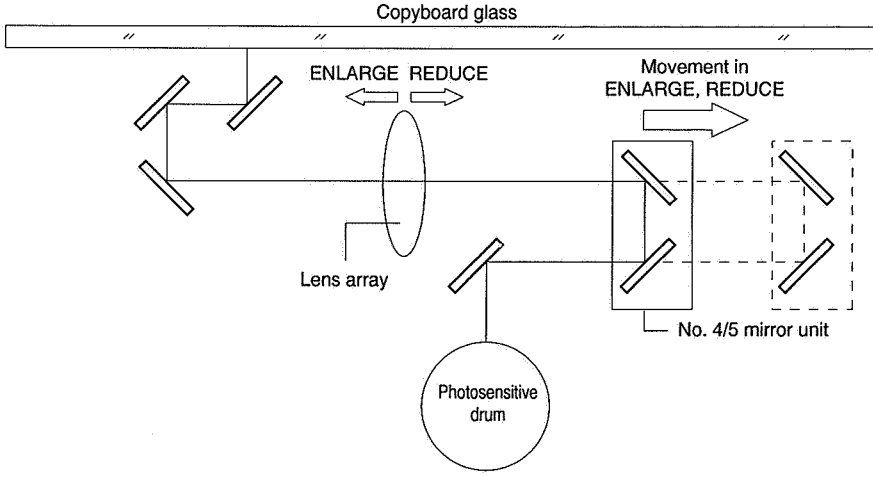


Figure 3-202

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B. Lens Drive System

1. Outline

The lens drive system is driven by the scanner motor (M2). When the lens solenoid (SL3) turns on, the switching gear is pushed in the direction of the arrow ⇨. When the scanner motor rotates in reverse (↺) in this condition, the lens unit moves in REDUCE direction by the work of gears and lens cable.

At the same time, the No. 4/5 mirror unit moves according to the travel (reproduction ratio) of the lens unit, changing the length of the optical path.

At this time, the blank exposure lamp also moves in relation to the lens to perform black erasure at the front and the rear.

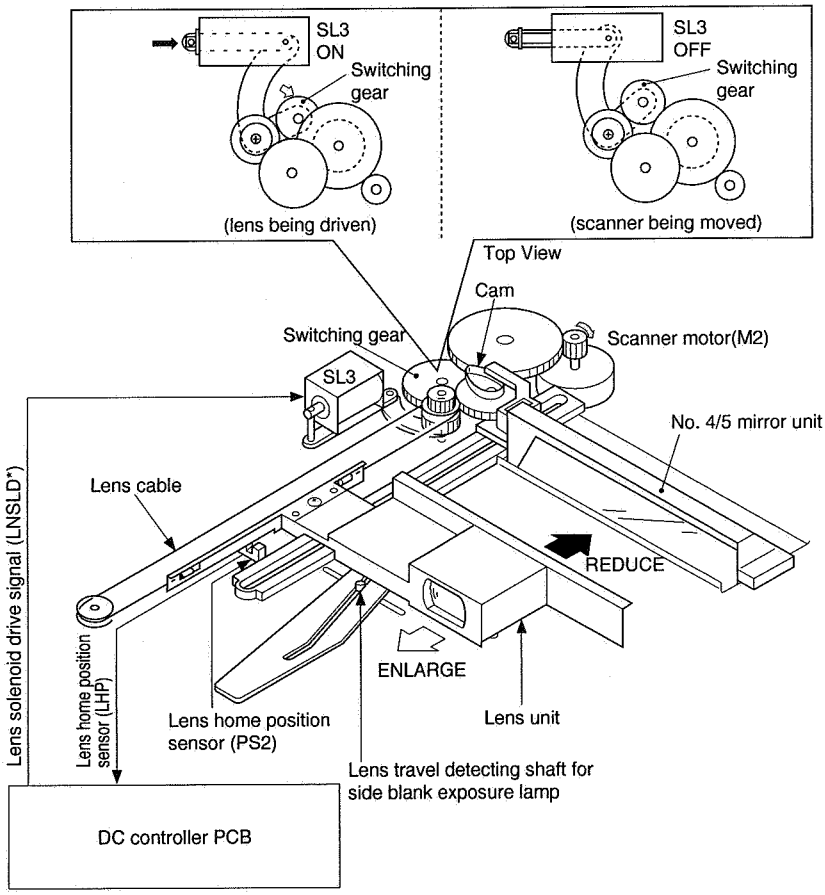

Figure 3-203

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C. Scanner Drive System

1. Outline

The scanner drive system is driven by the scanner motor (M2), which changes its direction of rotation so that the scanner moves forward or in reverse. The revolution at which the scanner is moved forward changes continuously according to the selected reproduction ratio, and the revolution at which the scanner is moved in reverse remains constant regardless of the selected reproduction ratio (about 3.4 times as fast as in forward in DIRECT).

The distance over which the scanner travels varies according to the length of copy paper and the selected reproduction ratio.

The scanner motor drives the lens drive system in addition to the scanner system.

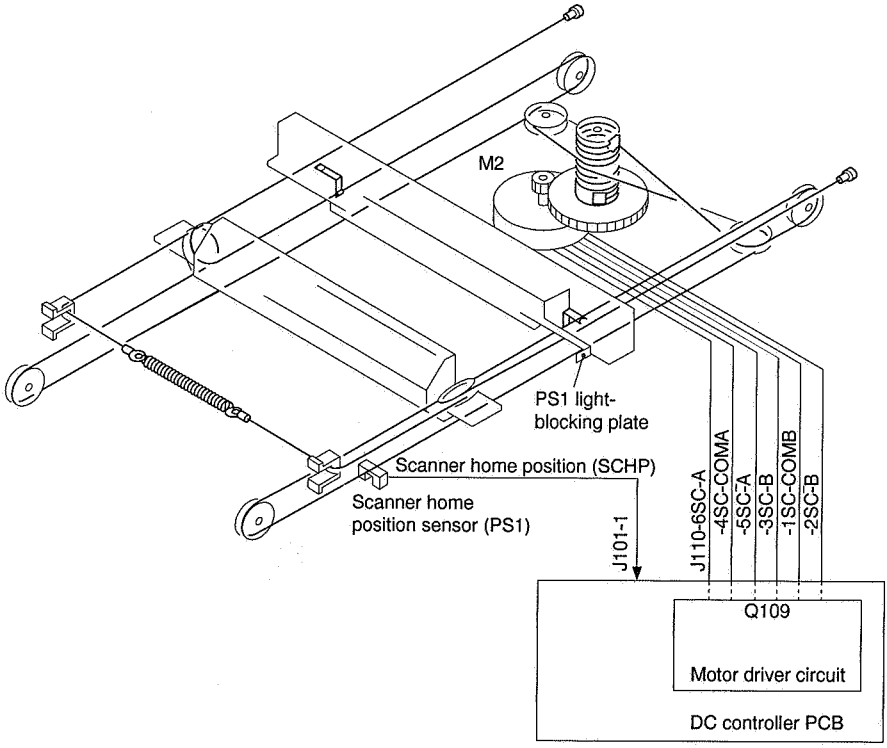

Figure 3-205

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2. Relationship between the Scanner Sensor and Signals

Scanner sensor	Signal	Scanner		Description
		Forward	Reverse	
Scanner home position sensor (PS1)	SCHP			Reference used to determine the forward travel distance.
				The scanner stops traveling in reverse in 0.1 sec.

Table 3-202

3. Basic Sequence of Scanner Operations

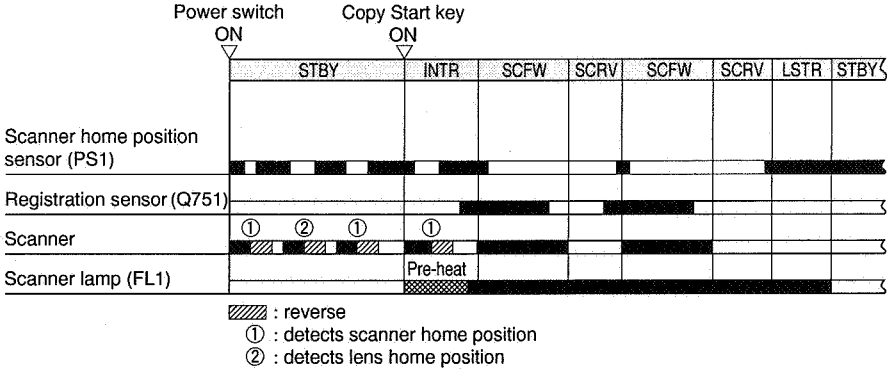

Figure 3-206

The microprocessor on the DC controller PCB controls the forward travel distance of the scanner with reference to the rising edge of the scanner home position signal. The forward travel distance varies depending on the length of copy paper* and the selected reproduction ratio in ENLARGE: if the ratio is less than 130%, the scanner is moved forward for A4 (297 mm); if the ratio is 130% or more, the scanner is moved for LTR (279 mm).

*For a discussion of how the length of copy paper is checked, see p. 3-44.

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4. Driving the Scanner Motor

a. Outline

The scanner motor (M2) is a 4-phase stepping motor. It is turned on or off and its direction and speed of rotation is changed by controlling the output timing of the drive power supply SC-COMA and SC-COMB and pulse signals A, A*, B, and B*.

b. Operation

The microprocessor (Q101) on the DC controller PCB receives such instructions as copying modes and reproduction ratios from the control panel circuit; and, in response, it sends drive pulses to the scanner motor (M2) through the motor drive circuit.

The scanner motor is a 4-phase stepping motor, and controls the direction and speed of scanning by changing the frequency and the sequence of drive pulses (SC-A through SC-B*).

The motor drive voltage on/off switching circuit supplies power to drive the motor and removes power to stop it. The current switching circuit sets the current flowing to the motor according to the speed of rotation; the motor driver circuit is used to control the rated current according to the setting.

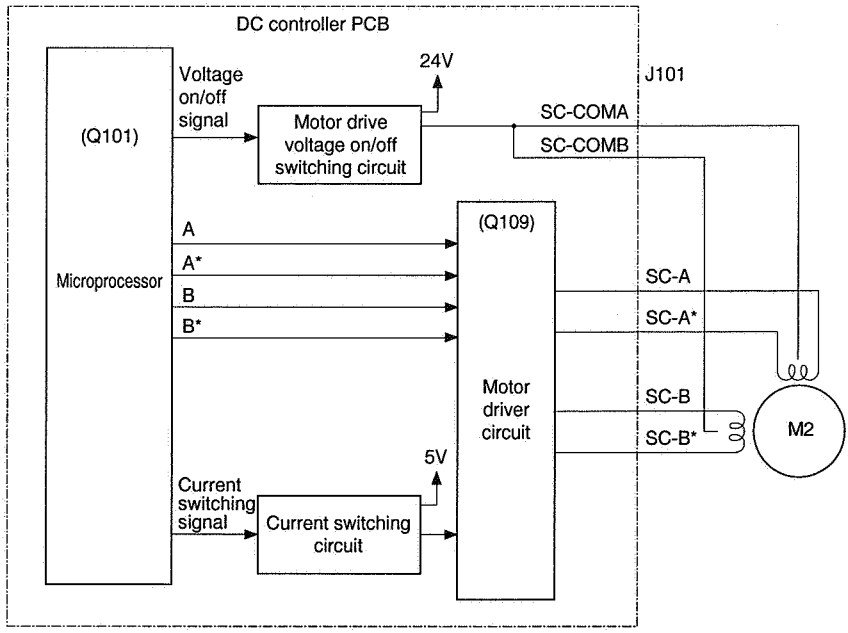

Figure 3-207

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III. IMAGE FORMATION SYSTEM

A. Outline

The copier's image formation system performs the following functions:

- controls the scanning lamp.
- controls the primary/transfer corona current.
- controls the developing bias.
- measures the density of the original.
- controls blank exposure.

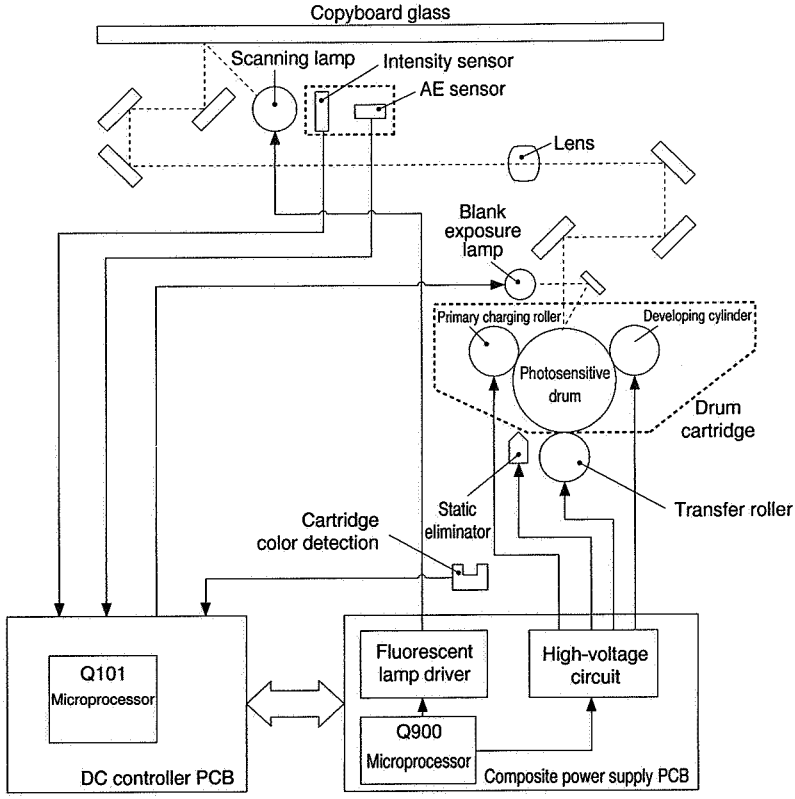

Figure 3-301

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B. Sequence of Operations (image formation system)

DIRECT, 2 Copies, Continuous

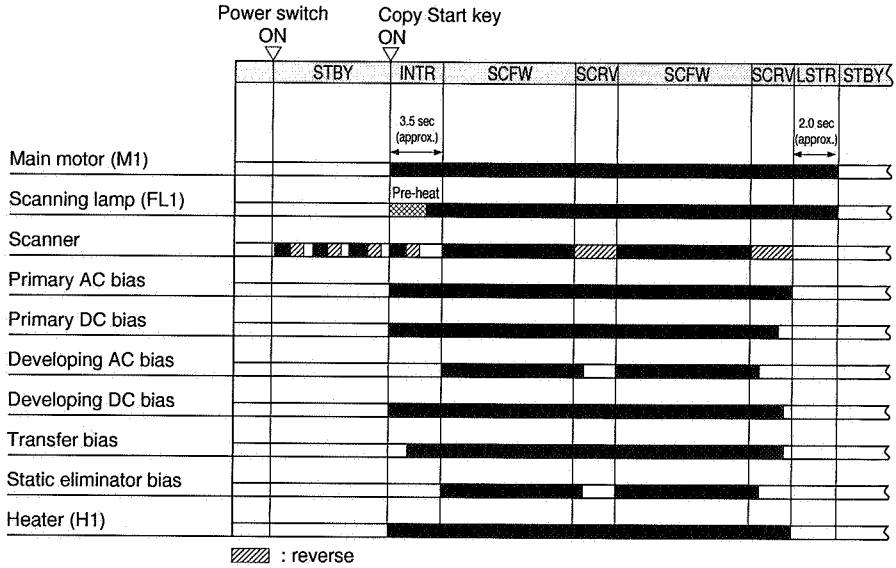

Figure 3-302

DIRECT, 2 Copies, Continuous; Copy Start key pressed immediately after power-on

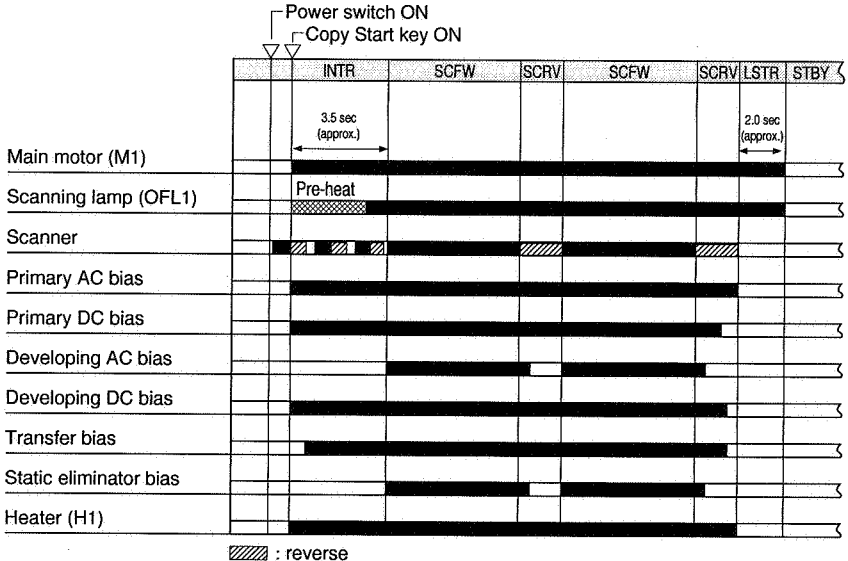

Figure 3-303

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C. Controlling the Scanning Lamp

1. Outline

Figure 3-304 shows the circuit that controls the scanning lamp (fluorescent lamp; FL1); the circuit has the following functions:

- controls pre-heating of the scanning lamp.
- turns on and off the scanning lamp.
- controls the intensity of the scanning lamp.

The copier's scanning lamp is a fluorescent lamp.

When not controlled, the fluorescent lamp tends to be dark immediately after it is turned on, glowing brighter only gradually; moreover, its intensity does not stabilize for some time if its ambient temperature is low.

In consideration of these characteristics of the fluorescent lamp, the copier is equipped with an intensity sensor so that the originals may be illuminated only after the intensity of the fluorescent lamp has stabilized.

The copier does not start copying operation until the intensity of the fluorescent lamp has been checked and verified that it has reached a specific value.

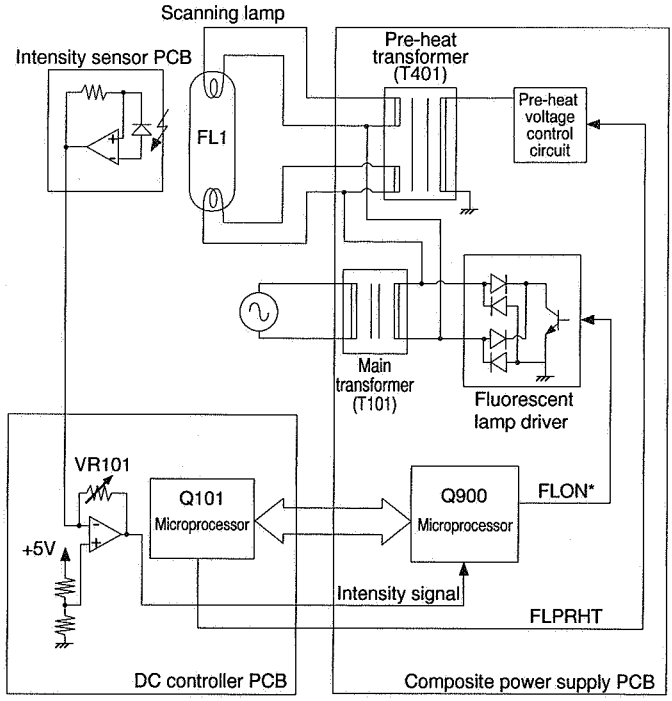

Figure 3-304

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2. Controlling the Scanning Lamp for Pre-Heating

Pre-heating is controlled for the following:

- before the scanning lamp turns on.
- while the scanning lamp remains on.

a. Controlling Pre-Heating before the Scanning Lamp Turns On

When the Copy Start key is pressed, the microprocessor (Q101) on the DC controller PCB sends the pre-heating voltage control signal (FLPRHT) to the pre-heating voltage control circuit on the composite power supply PCB. In response, the pre-heating voltage control circuit supplies 4 Vrms (effective value) to the filament of the scanning lamp.

About 3 sec later, the microprocessor on the DC controller causes the pre-heating voltage control signal (FLPRHT) to go '0', to end the pre-heating operation executed before the scanning lamp turns on.

b. Controlling Pre-Heating While the Scanning Lamp Remains On

While the scanning lamp remains on, the microprocessor (Q900) on the composite power supply PCB sends the duty ratio of the on control signal to the microprocessor (Q101) on the DC controller PCB. In response, the microprocessor (Q101) on the DC controller sends the pre-heating control signal (FLPRHT) to the pre-heating voltage control circuit to execute pre-heating control suited to the duty ratio of the on control signal for pre-heating control.

Reference:

Activation of the Fluorescent Lamp

The fluorescent lamp repeats turning on and off in specific cycles. While it is off, voltage is applied to its filament so that it will turn on smoothly, and the period during which such a voltage is being applied is called pre-heating period.

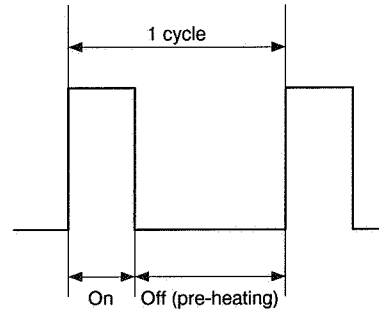

Figure 3-305

The intensity of the fluorescent lamp changes within a single cycle depending on how long the lamp remains on:

- longer on time ➡ higher intensity
- shorter on time ➡ lower intensity

The ratio of on time within a single cycle is called duty ratio, and may be expressed by the following formula:

$$\text{Duty ratio} = \frac{\text{ON time}}{\text{1 cycle}}$$

- higher duty ratio ➡ increased intensity
- lower duty ratio ➡ decreased intensity

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3. Turning On and Off the Scanning Lamp

a. Outline

When pre-activation pre-heating is over, the microprocessor (Q101) on the DC controller PCB instructs the microprocessor (Q900) on the composite power supply PCB to generate the scanning lamp on signal (FLAON*). At this time, the fluorescent lamp driver circuit operates to apply the output of the primary side of the main transformer (T101) to both ends of the scanning lamp so as to turn on the scanning lamp at a high frequency.

4. Controlling the Intensity of the Scanning Lamp

a. Outline

The intensity of the scanning lamp is controlled by the microprocessor (Q900) on the composite power supply PCB.

The intensity sensor checks the intensity of the scanning lamp and generates activation power to suit the intensity. The microprocessor, on the other hand, finds out the intensity of the scanning lamp based on the activation power to send the scanning lamp on signal (FLON*) to the on control circuit.

b. Intensity Lower Than the Specified Value

The microprocessor increases the duty ratio of the scanning lamp on signal (FLON*) sent to the fluorescent lamp driver. The fluorescent lamp driver, in turn, increases the current flowing to the scanning lamp, thereby increasing the intensity of the scanning lamp.

c. Intensity Higher Than the Specified Value

The microprocessor decreases the duty ratio of the scanning lamp on signal (FLON*) sent to the fluorescent lamp driver. The fluorescent lamp driver, in turn, decreases the current flowing to the scanning lamp, thereby decreasing the intensity of the scanning lamp.

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D. Controlling the Primary Charging Roller Bias

1. Outline

Figure 3-206 shows the circuit that controls the application voltage of the primary charging roller, and the circuit has the following functions:

- turns on and off the DC/AC bias.
- controls the DC bias to a constant voltage.
- controls the AC bias to a constant voltage.
- switches the DC bias voltage level.

The primary charging roller is given both DC and AC biases so as to maintain the surface potential of the photosensitive drum to a specific value. The DC bias is switched according to whether or not a copy image is being formed.

Reference:

DC component:	-400/-625V
AC component:	1700 Vpp to 3000 Vpp

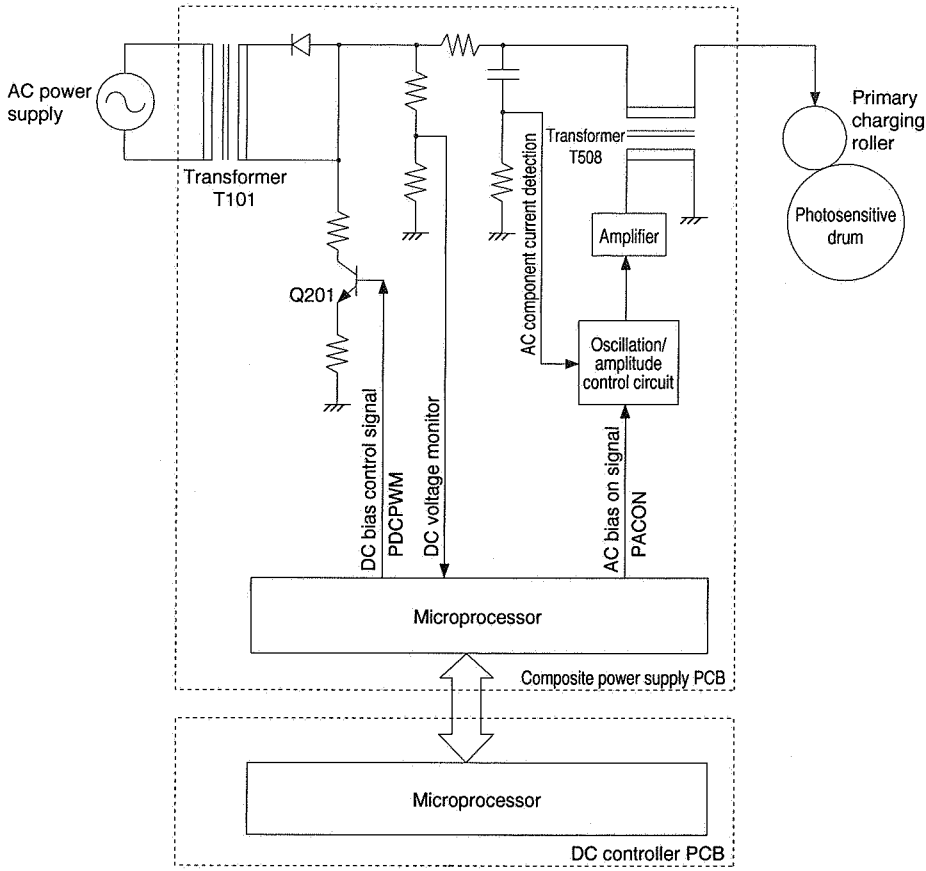

Figure 3-306

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2. Operation

a. Turning On and Off the DC/AC Bias

When the Copy Start key is pressed, the microprocessor on the DC controller PCB instructs the microprocessor on the composite power supply PCB to turn on the DC/AC bias.

The microprocessor on the composite power supply PCB drives the main transformer (T101) while sending the AC bias on signal to the oscillation/amplitude control circuit.

The AC bias is supplied to the primary charging roller through the amplifier and the transformer (T508) by the pulse signals generated by the oscillation/amplitude control circuit.

b. Controlling the DC Bias to a Specific Voltage

The DC bias is controlled to a specific voltage by the microprocessor on the composite power supply PCB. The microprocessor on the composite power supply PCB constantly monitors the DC voltage. The microprocessor serves to maintain the DC bias voltage to a constant value by varying the DC bias control signal (PDCPWM) based on measurements of voltage taken.

c. Controlling the AC Bias to a Specific Current

The AC bias is controlled to a specific current by the oscillation/amplitude control circuit. The oscillation/amplitude control circuit checks the current of the AC component and changes the amplitude based on measurements of current taken so as to maintain the AC bias current constant.

d. Switching the DC Bias Voltage Level

The copier switches the level of the DC bias voltage according to whether or not copy images are being formed.

The DC bias voltage is switched by the microprocessor on the composite power supply PCB by varying the DC bias control signal (PDCPWM) according to the DC bias switching timing signal sent by the microprocessor on the DC controller PCB.

during copying: -625 V
other: -400 V

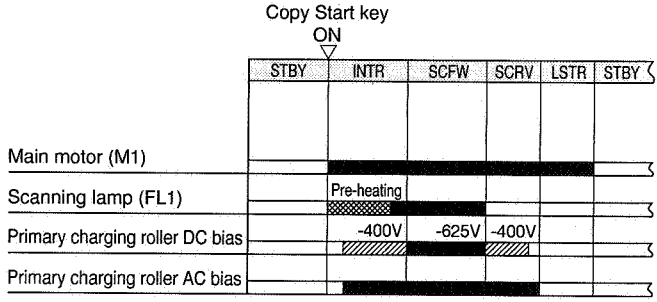

Figure 3-307

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E. Controlling the Developing/ Separation Static Eliminator Bias

1. Outline

Figure 3-308 shows the circuit that controls the developing/separation static eliminator bias, and the circuit has the following functions:

- turns on and off the DC component.
- turns on and off the AC component.
- controls the voltage level of the DC bias according to type of developing assembly.
- controls the voltage level of the DC bias according to the copy density settings.

The developing cylinder is given AC and DC biases during copying operation.

While the photosensitive drum is rotating, except during development, about -500 V is applied to the developing cylinder regardless of the position of the density adjusting lever, thereby preventing adhesion of excess toner to the surface of the photosensitive drum.

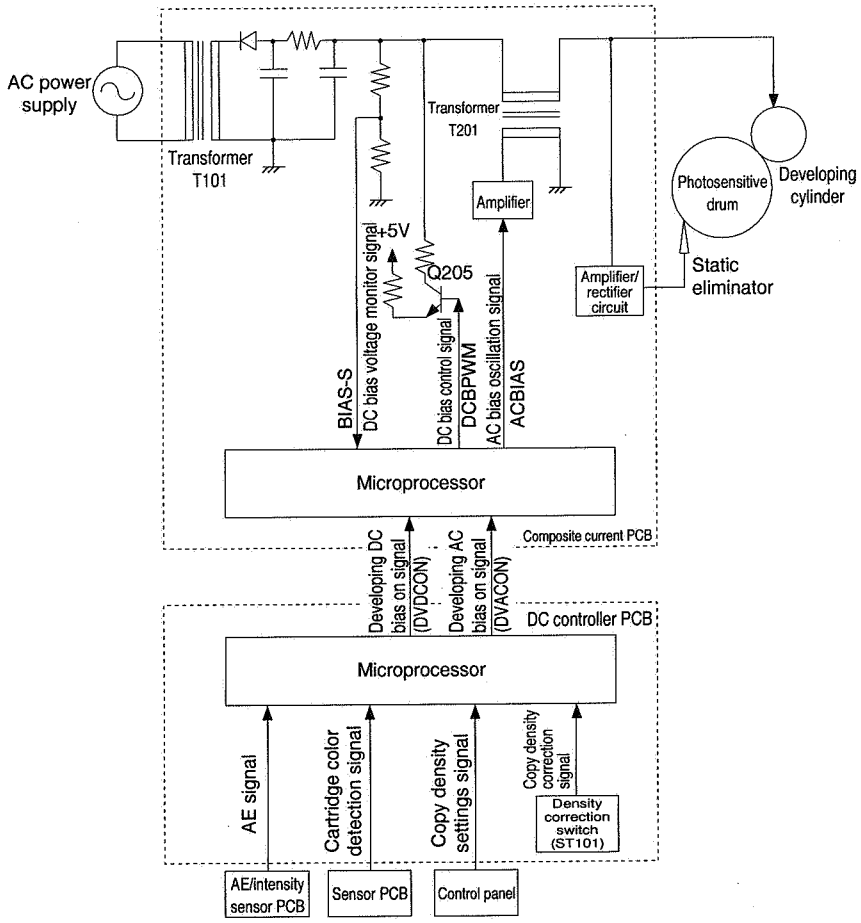

Figure 3-308

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2. Turning On and Off the DC Component

As soon as the Copy Start key is pressed, the microprocessor on the DC controller PCB sends the developing DC bias on signal (DVDCON) to the microprocessor on the composite power supply PCB.

In response, the microprocessor on the composite power supply PCB drives the main transformer (T101) to generate a DC bias for the developing cylinder.

When the developing DC bias on signal (DVDCON) from the microprocessor on the DC controller is cut, the microprocessor on the composite power supply PCB stops the drive to the main transformer (T101), thereby cutting off the DC bias.

3. Turning the AC Component On and Off

About 3.5 sec after the Copy Start key is pressed, the microprocessor on the DC controller PCB sends the developing AC bias on signal (DVACON) to the microprocessor on the composite power supply PCB.

The microprocessor on the composite power supply sends the AC bias oscillation signal (ACBIAS) to the amplifier, which in turn drives the transformer (T201) and generates an AC bias for the developing cylinder.

The AC output of the transformer (T201) is transformed/rectified and then supplied to the static eliminator.

When the developing AC bias on signal (DVACON) from the microprocessor on the DC controller PCB is cut off, the microprocessor on the composite power supply PCB stops the AC bias oscillation signal (ACBIAS) to cut off the AC bias supply.

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4. Controlling the Voltage Level of the DC Bias to Suit the Copy Density Setting

The copier varies the DC bias control signal (DCBPWM) according to the settings shown below to vary the DC component voltage, thereby controlling the copy density.

- setting of the density adjusting lever (manual control mode)
- output of the AE sensor (automatic control mode)
- type of developing assembly

Type of developing assembly	DC bias
Black	-80V to -550V
Color	-115V to -580V

The density correction switch (SW101) on the DC controller PCB may be set to either of the three settings by the user, selected to correct foggy images caused by changes in the sensitivity of the photosensitive drum. The density correction switch (SW101) functions when the density is adjusted in manual mode or during automatic density adjustment mode.

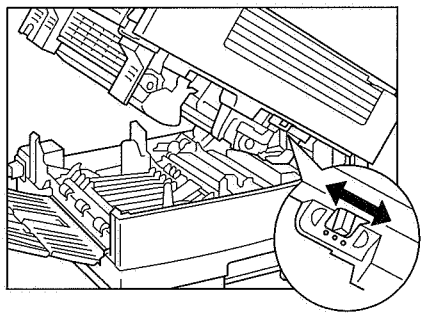

Figure 3-309

See Figures 3-310 through -313 for changes in the DC bias according to the setting of the density adjusting lever in manual mode and to the changes in the AE sensor output in automatic mode.

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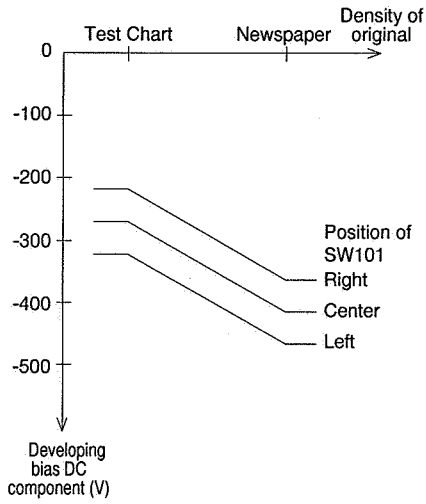
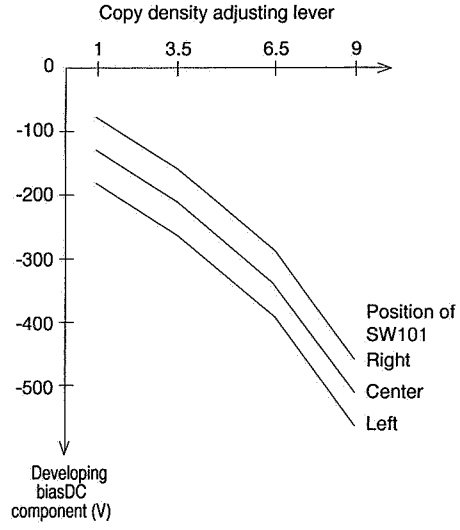
a. Black Developing Assembly



AE Mode

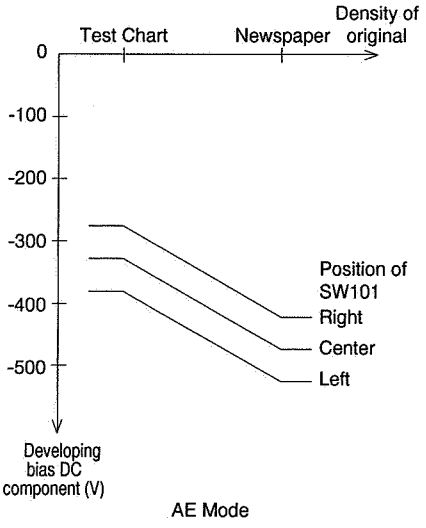
Figure 3-310



Manual Density Mode

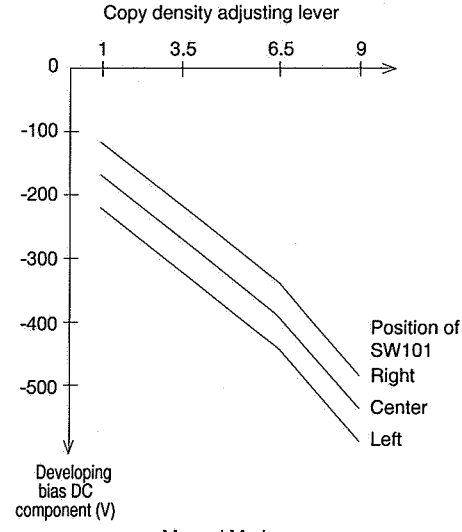
Figure 3-311

b. Color Developing Assembly



AE Mode

Figure 3-312



Manual Mode

Figure 3-313

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F. Controlling the Transfer Roller Bias

1. Outline

The copier uses a direct transfer method with a roller. For this reason, it controls the bias differently from the conventional copiers that employ corona charging.

The transfer roller bias may be either of the following three types; see the descriptions for the function and output timing of each:

a. Transfer Bias

This bias corresponds to the transfer bias of a conventional copier, and is a negative voltage.

b. Cleaning Bias

The copier uses a direct charging method, and could allow adhesion of toner to the transfer roller moving from the photosensitive drum because of a jam.

To remove such toner, the copier applies a positive voltage at a specific timing to return the toner from the transfer roller to the photosensitive drum.

- during initial rotation after the Copy Start key is pressed.
- while the scanner is moving in reverse.
- during last rotation.

c. Reference Bias (ATVC)

Changes in the environment or deterioration of the transfer roller can change the resistance of the transfer roller, ultimately affecting the transfer efficiency.

To suppress the changes in the copy images caused by changes in the transfer efficiency, the copier corrects the level of transfer bias application.

The transfer ATVC bias is a bias applied each time the Copy Start key is pressed to determine the correction value.

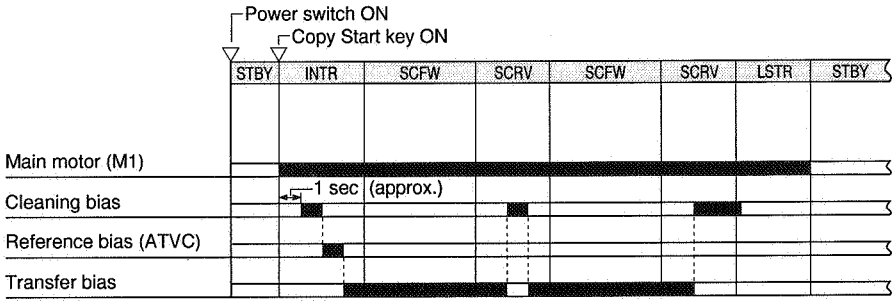

Figure 3-314

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Figure 3-315 shows the circuit that controls the foregoing three types of bias, and the circuit has the following functions:

- turns on and off the transfer roller bias.
- controls the transfer bias to a constant voltage.
- corrects the voltage level of the transfer bias (ATVC)
- switches the polarity of the DC bias (cleaning).

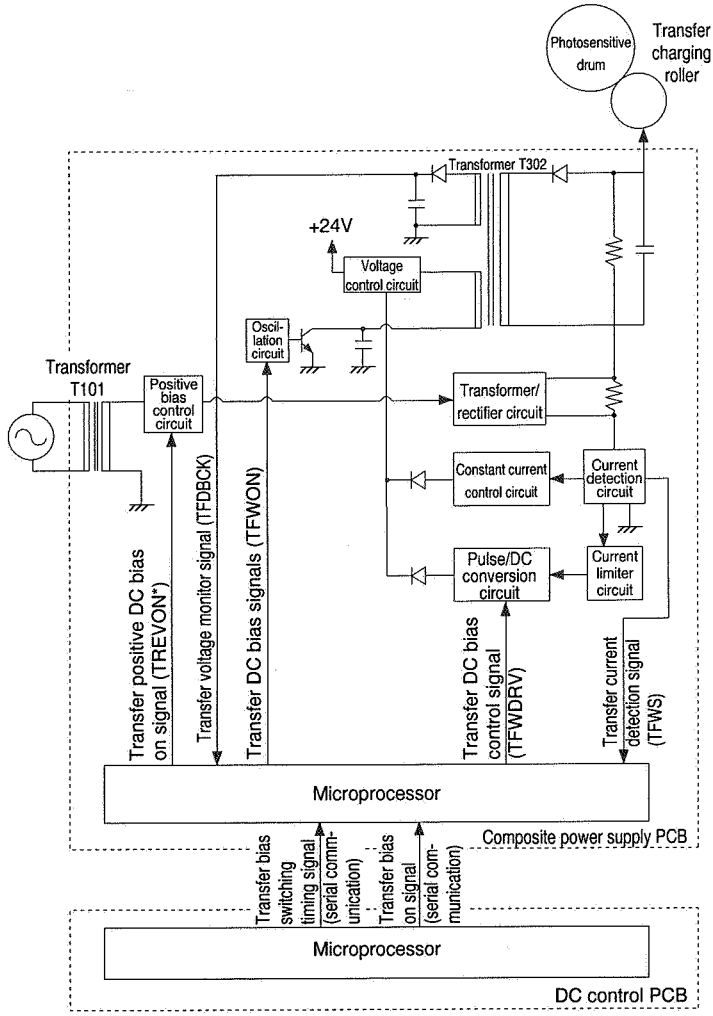

Figure 3-315

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2. Turning On and Off the Transfer Roller Bias

The microprocessor on the DC controller PCB sends the transfer bias on signal to the microprocessor on the composite power supply PCB. In response, the microprocessor on the composite power supply generates the transfer bias on signal to drive the transformer (T302), thereby supplying the transfer charging roller with transfer bias.

3. Controlling the Transfer Bias to a Specific Voltage

The transfer bias is controlled to a specific voltage by the microprocessor on the composite power supply PCB. The microprocessor on the composite power supply PCB monitors the voltage of the transfer bias at all times. The microprocessor on the composite power supply PCB sends the transfer bias control signal through the pulse/DC conversion circuit according to the detected voltage to the voltage control circuit to maintain the transfer bias to a specific voltage.

4. Correcting the Voltage Level of the Transfer Bias

The copier corrects the voltage level of the transfer bias in any of the following two ways:

- before starting copying (ATVC)
- after starting copying

a. Before Starting Copying (ATVC)

To correct changes in the transfer efficiency caused by changes in the environment or deterioration of the transfer roller, the copier automatically corrects the application voltage level of the transfer bias.

During initial rotation after the Copy Start key is pressed, the copier feeds a specific current to the transfer roller. The current detection circuit on the composite power supply PCB sends measurements of the current to the microprocessor in the form of the current detection signal. The microprocessor determines the voltage to be applied to the transfer roller based on such data.

This control is executed once during initial rotation after a press on the Copy Start key.

b. After Starting Copying

The copier automatically corrects the application voltage during copying operation to compensate for the changes in the transfer efficiency caused by different types of copy paper.

The current detection circuit detects the current flowing through the transfer charging roller and sends the data to the microprocessor on the composite power supply PCB. Using the data, the microprocessor determines the voltage to be applied to the transfer charging roller and controls the DC bias voltage by generating the transfer DC bias control signal so that the voltage will be optimum.

5. Switching the Polarity of the DC Bias (cleaning)

The microprocessor on the DC controller PCB sends the transfer bias switching timing signal to the microprocessor on the composite power supply PCB.

The microprocessor on the composite power supply PCB, on the other hand, turns off the transfer DC bias on signal and, at the same time, sends the transfer positive DC bias on signal to the positive bias control circuit. The voltage from the positive bias control circuit is sent to the transfer charging roller through the transformer/rectifier circuit.

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G. Measuring the Density of the Original (AE)

1. Outline

The copier is equipped with an automatic density adjustment (AE) mechanism which adjusts the DC component of the developing bias. As long as the original has an even overall density, the AE mechanism ensures the generation of copies without fogging by varying the DC component of the developing bias to suit the density of the original.

The copier's AE mechanism does not execute an AE scan; rather, it measures the density of the original during initial rotation at the scanner home position; for this reason, the copying speed remains the same in both AE and non-AE modes.

Figure 3-316 shows the circuit that controls the measurement of the density of originals.

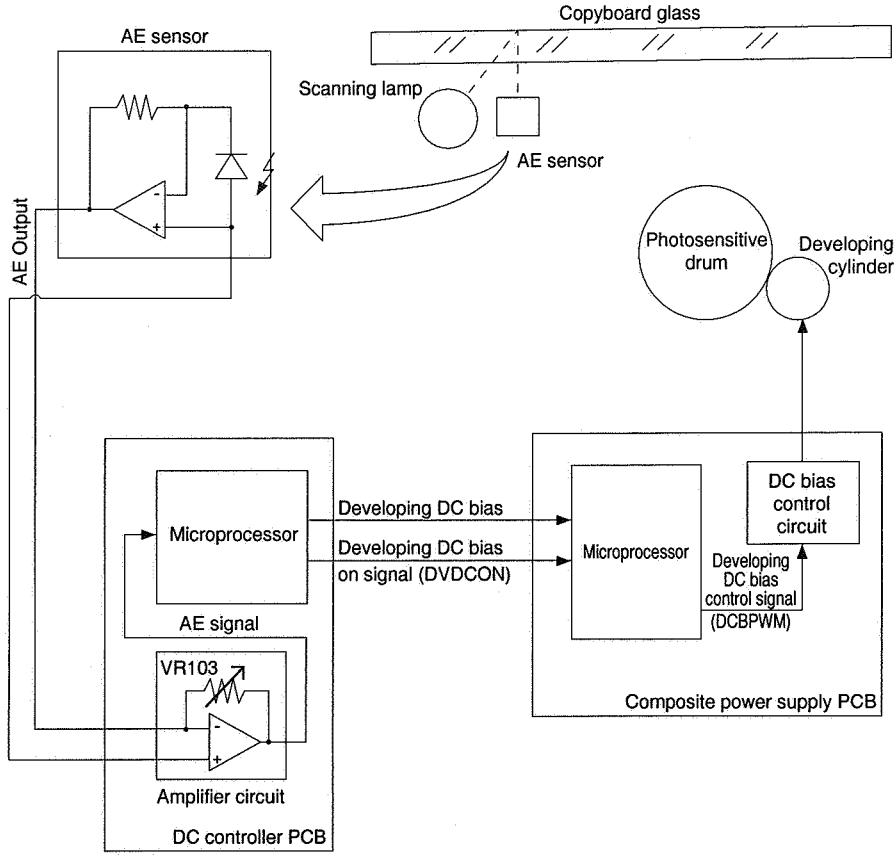

Figure 3-316

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2. Operation

To measure the density of an original, the scanning lamp is turned on at a specific intensity to expose the original during initial rotation with the scanner at the home position.

The light reflected by the area shown in Figure 3-317 is checked by the AE sensor (photodiode), whose output is amplified and sent to the microprocessor on the DC controller PCB as the AE signal.

The microprocessor on the DC controller PCB checks the AE signal four times, and averages the measurements to compute the developing DC bias which best matches the averaged density of the original; it then sends the developing DC bias signal and the developing DC bias on signal to the microprocessor on the composite power supply PCB.

The microprocessor on the composite power supply PCB generates the developing DC bias control signal (DCBPWM) based on the value of the DC bias.

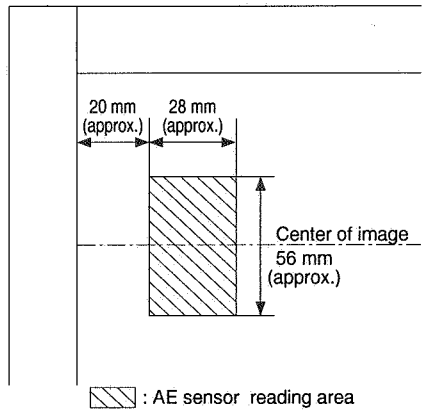

Figure 3-317

3. Basic Sequence of Operations (AE measurement)

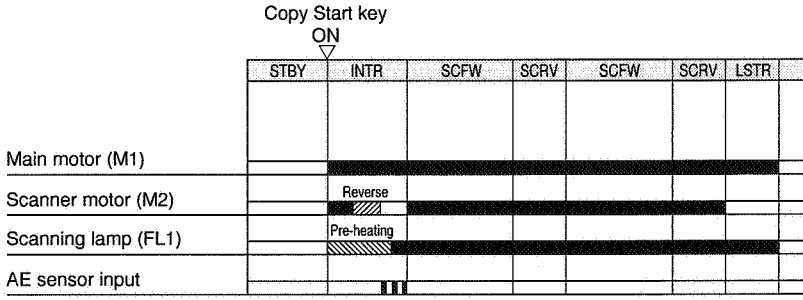

Figure 3-318

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4. AE Adjustment (VR102, VR103)

Make the following adjustments whenever you have replaced the scanning lamp or the intensity/AE sensor PCB:

Preparing for Adjustment

- Obtain a newspaper whose print is as even as possible; avoid one with photos or with large headings.
- Make sure you have adjusted the intensity of the scanning lamp.

1) Short the two jumper wires (JP3, JP4) on the DC controller PCB.

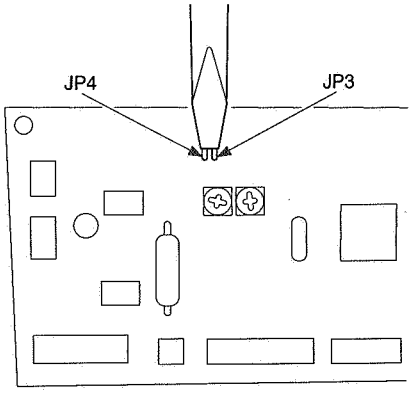

Figure 3-319

2) With the terminals shorted, turn on the power switch.
   - The scanning lamp should turn on, and the main motor (M1) should rotate.
3) Stop shorting the two terminals of the connector J116.
4) Turn VR103 on the DC controller PCB fully clockwise.

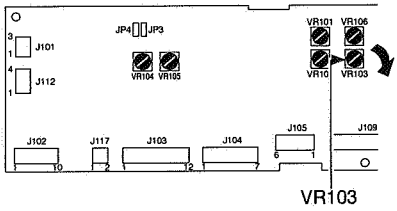

Figure 3-320

5) Place a newspaper on the copyboard, and close the copyboard cover.
6) Turn VR102 so that the reading in the display is between b2 and bc.

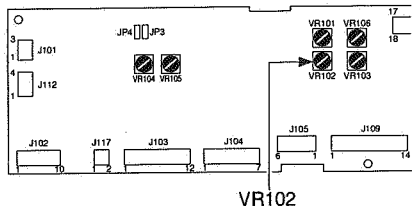

Figure 3-321

7) Remove the newspaper from the copyboard, and place a stack of five sheets of copy paper on the copyboard glass instead; then, close the copyboard cover.
8) Turn VR103 on the DC controller PCB so that the reading in the display of the control panel is between 53 and 5d.

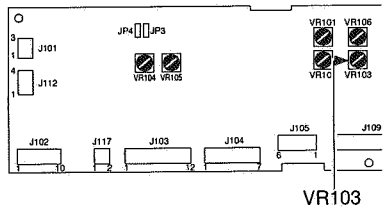

Figure 3-322

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9) Make one copy, and check if it is free of fogging but the print is dark enough.
   - If fogging is noted or the characters are too light, repeat the steps starting with step 1) once again.
   - If the problem cannot be corrected after going through the steps once again, use the density correction switch (SW101).

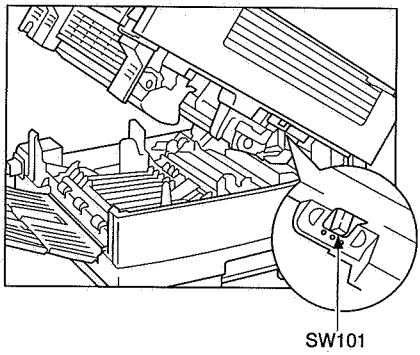

Figure 3-323

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H. Controlling the Side Blank Exposure

1. Outline

The copier is equipped with a side blank exposure lamp at the front and the rear to prevent adhesion of toner to the drum when reduced copies are made.

2. Operation

The side blank exposure lamp moves based on the travel distance of the lens as measured by the lens travel detecting shaft for reduced copies for blanking out the non-image areas.

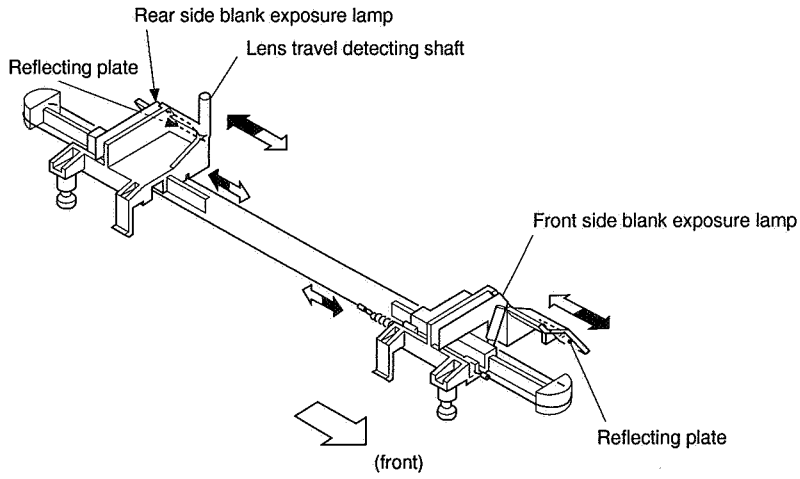
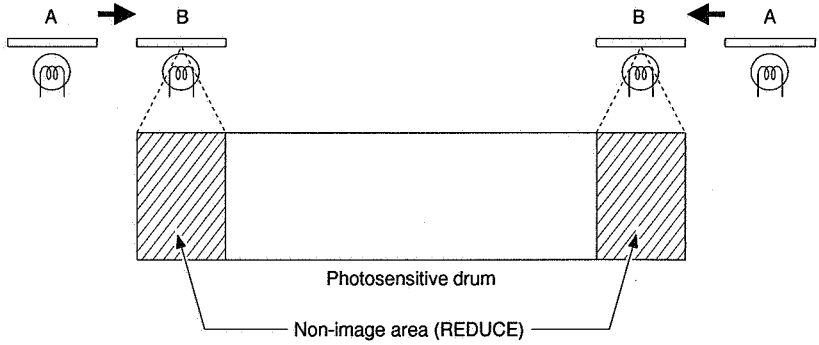


Figure 3-324



A : position of the side blank exposure lamp at time of DIRECT/ENLARGE.
B : position of the side blank exposure lamp at time of REDUCE.

Figure 3-325

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IV. PICK-UP/FEEDING SYSTEM

A. Outline

The copier uses center reference feeding, in which copy paper is moved while centered along the pick-up/feeding path; the pick-up system consists of a single-cassette path or a multifeeder path.

Copy paper from the cassette or the multifeeder is controlled by the registration roller so that it matches the leading edge of the image on the photosensitive drum; it is then moved to the transfer, separation, feeding, and fixing assemblies before it is discharged to the copy tray.

The copier is equipped with three sensors to monitor the movement of copy paper.

No.	Name	Remarks
PS3	Delivery paper sensor	
Q751	Pre-registration roller paper sensor	
PS7	Singlefeeder paper sensor	PC720/740

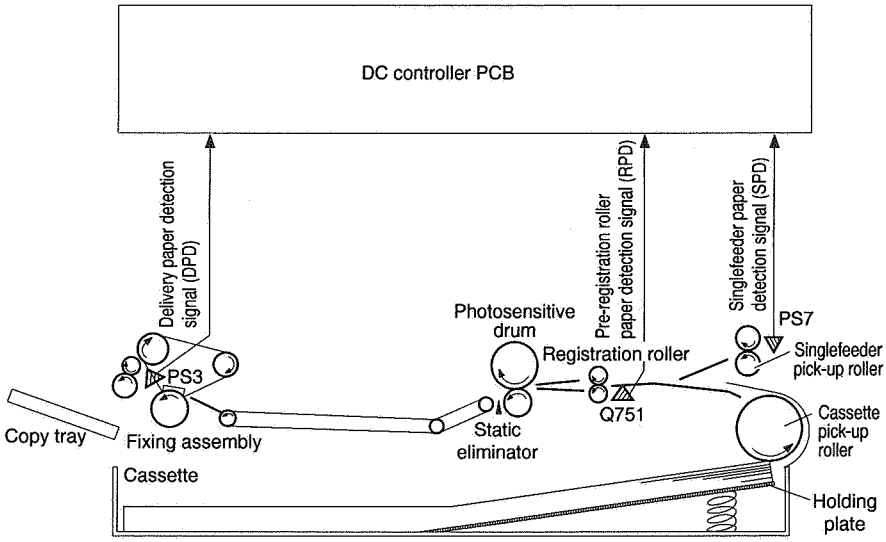

Figure 3-401a (PC720/740)

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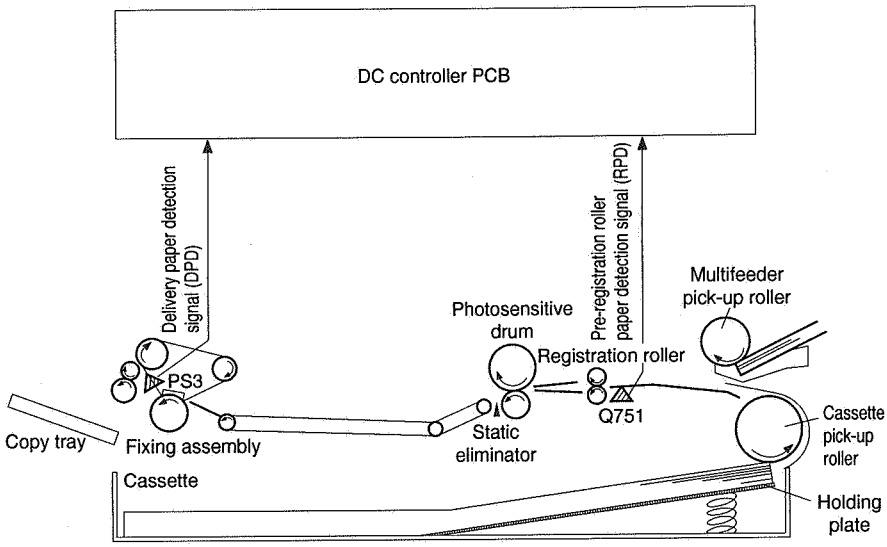

Figure 3-401b (PC750/770)

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B. Controlling the Pick-Up Roller

1. Outline

The construction of the copier's pick-up roller differs depending on the model.

The PC720/740's pick-up roller consists of a cassette pick-up roller and a singlefeeder pick-up roller. The cassette pick-up roller starts to rotate as soon as the pick-up solenoid turns on while the main motor is rotating.

The single feeder pick-up roller rotates whenever the main motor is rotating.

The PC750/770's pick-up roller consists of a cassette pick-up roller and a multifeeder pick-up roller. The drive to these pick-up rollers is switched by the gear unit, which changes the route of drive transmission; this way, the drive is transmitted to either of the two at a time.

2. Controlling the Cassette Pick-Up Roller

The cassette pick-up roller is controlled by the spring clutch, control ring, and pick-up solenoid (SL1).

When the solenoid turns on, the pawl moves away from the control ring, thereby allowing the drive of the main motor (M1) to be transmitted to the pick-up roller.

When the pick-up roller starts to rotate, copy paper is picked up and sent as far as the registration roller. The registration roller, in turn, serves to control the copy paper so that it matches the leading edge of the image on the photosensitive drum.

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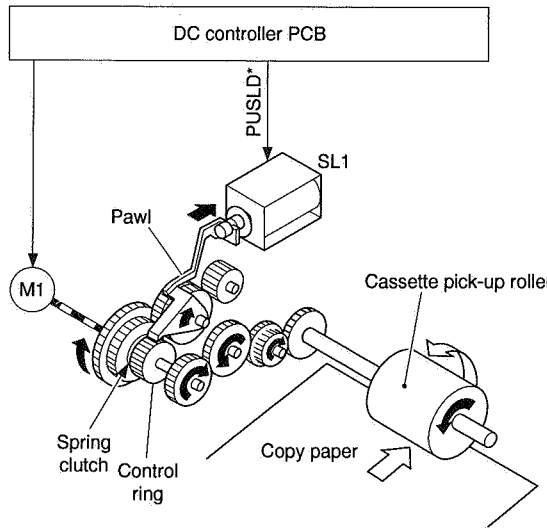

Figure 3-402a (PC720/740)

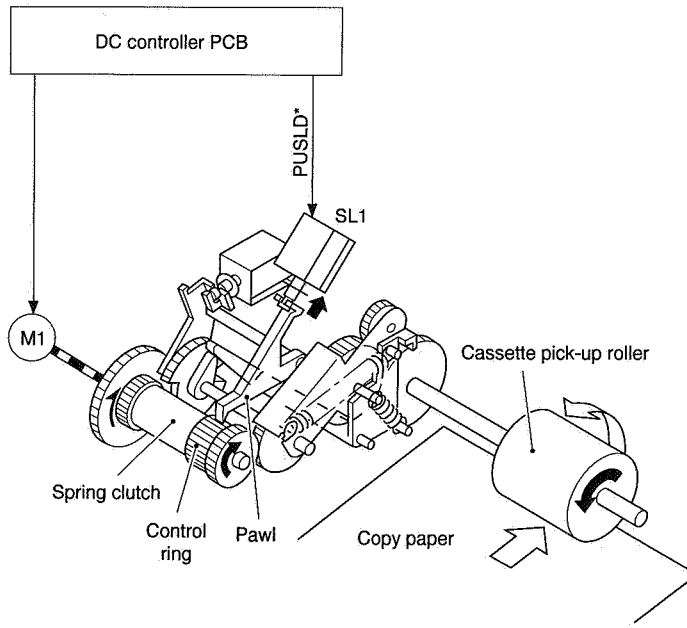

Figure 3-402b (PC750/770)

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3. Controlling the Singlefeeder Pick-Up Roller

The singlefeeder pick-up roller is controlled by the singlefeeder paper sensor (PS7).

When copy paper is inserted into the singlefeeder assembly, the single feeder paper sensor turns on; the main motor (M1) starts to rotate automatically as soon as the single feeder paper sensor turns on.

When the main motor (M1) rotates, the single feeder pick-up roller starts to rotate to move the copy paper to the registration roller, which controls the copy paper so that its leading edge matches the leading edge of the image on the photosensitive drum.

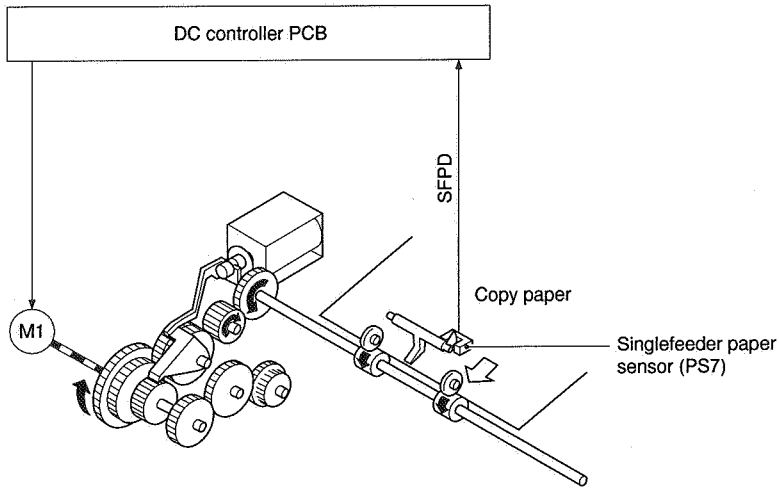

Figure 3-403

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4. Controlling the Multifeeder Pick-Up Roller

The multifeeder pick-up roller is controlled by the spring clutch, control ring, pick-up solenoid (SL1), gear unit, lift arm, and multifeeder pick-up solenoid (SL4).

When the multifeeder pick-up solenoid (SL4) turns on, the drive of the main motor (M1) is transmitted to the cam gear. When the cam gear starts to rotate, the lifter which is in contact with the cam gear starts to lift the gear unit and, at the same time, lowers the paper guide plate. The cam gear is designed to stop at a specific location.

When the solenoid (SL1) turns on while the mechanism is in this spatial relationship, the pawl moves away from the control ring, allowing the drive of the main motor (M1) to be transmitted to the multifeeder pick-up roller.

When the multifeeder pick-up roller rotates, copy paper is picked up and sent as far as the registration roller. The registration roller in turn controls the copy paper so that its leading edge matches the leading edge of the image on the photosensitive drum.

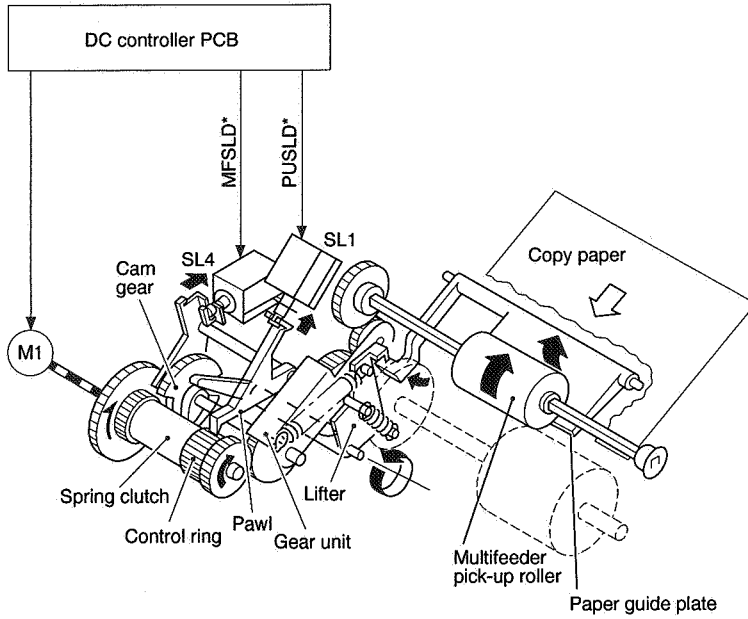

Figure 3-404

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C. Controlling the Feeding Mechanism

1. Controlling the Registration Roller

The registration roller is controlled by the spring clutch, control ring, registration sensor, and registration solenoid (SL2).

When the microprocessor on the DC controller PCB receives the pick-up detection signal from the pre-registration paper sensor (Q751), it turns on the registration solenoid at a specific timing. When the registration solenoid turns on, the pawl moves away from the control ring, allowing the drive of the main motor to be transmitted to the registration roller and moving the copy paper to the photosensitive drum.

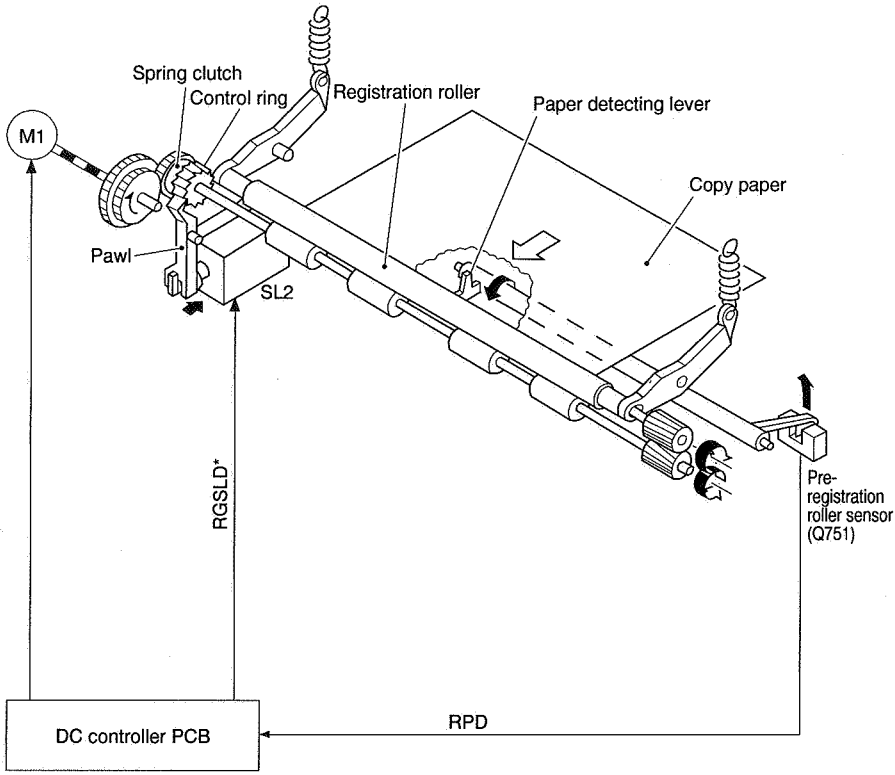

Figure 3-405

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2. Basic Sequence of Operations (pick-up/feeding; A4, 2 copies)

a. Pick-Up from the Cassette

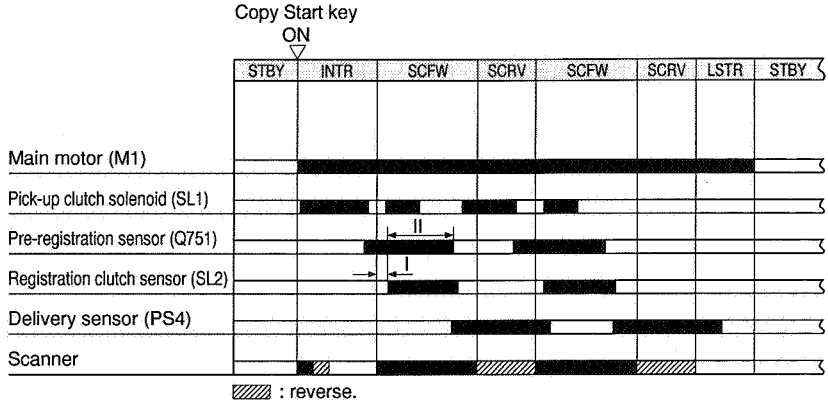
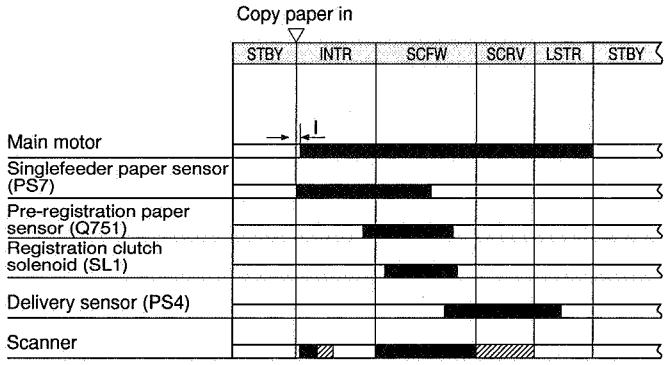


Figure 3-406

b. Single Feeder Sequence (A4, 1 copy)



I : The main motor (M1) turns on when the singlefeeder paper sensor (PS7) remains on for about 0.3 sec continuously.

Figure 3-407

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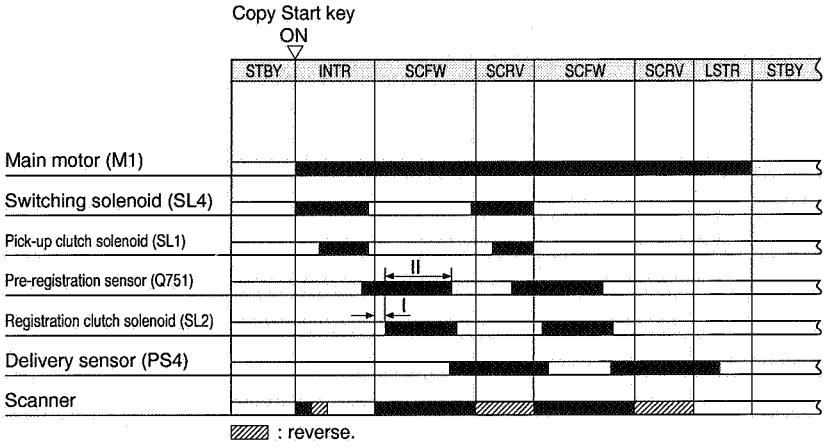
c. Pick-Up from the Multifeeder



I : Varied by VR104 on the DC controller PCB (registration adjustment).
II : Used for measuring the length of copy paper.
length of copy paper (mm) = 92 (mm/s) x II (s) + 11 (mm) - 10 (mm)
92 (mm/s): speed at which copy paper is moved.
11 (mm): distance between pre-registration sensor and registration roller.
10 (mm): length of actuator of the pre-registration sensor.

Figure 3-408

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D. Fixing and Delivery

1. Outline

The drive roller of the fixing assembly is driven by the main motor (M1).

The rotation of the drive roller turns the fixing film, ultimately rotating the lower fixing roller.

The temperature of the fixing heater is monitored by the thermistor (TH1), and is communicated to the microprocessor on the DC controller PCB as the fixing heater temperature signal (TH1).

Based on the value of the TH1 signal, the microprocessor on the DC controller PCB changes the fixing heater drive signal (HTRD) to control the temperature of the fixing heater.

The rear end of the fixing heater is equipped with a sub thermistor (TH2) to check for overheating.

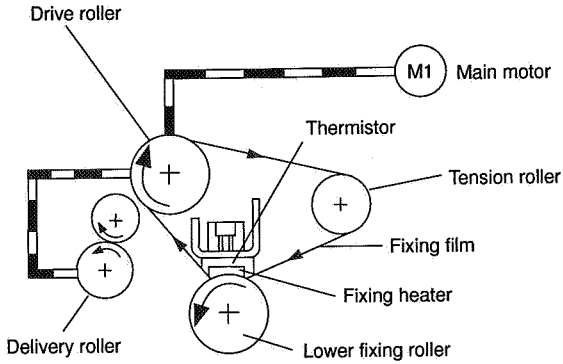

Figure 3-409

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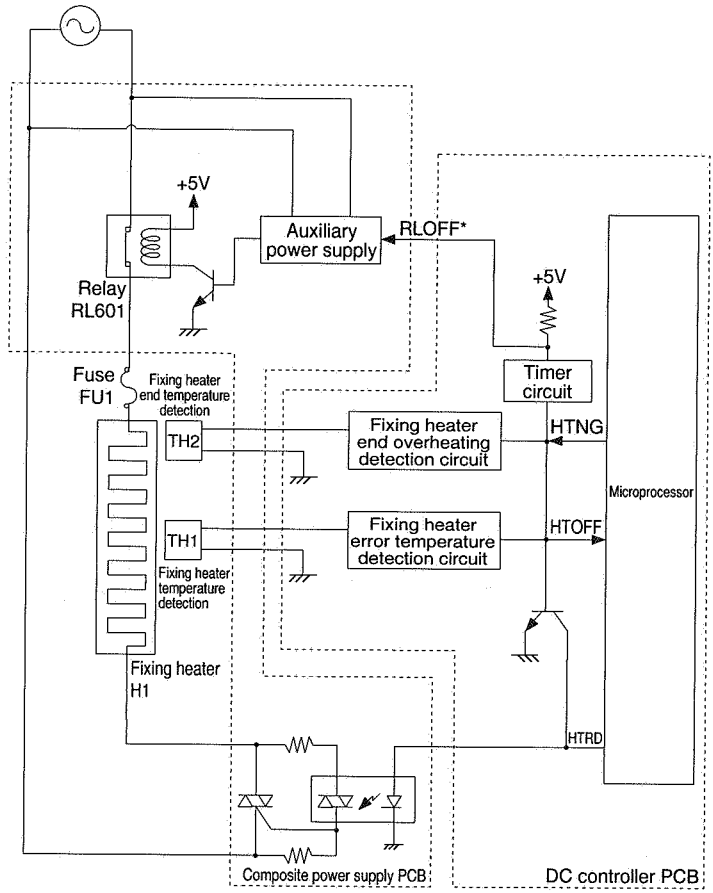

Figure 3-410

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2. Controlling the Temperature of the Fixing Heater

The copier keeps the fixing heater off while in standby state, and starts supplying the fixing heater with power when the Copy Start key is pressed.

The control temperature for the fixing heater is determined in response to the first press on the Copy Start key after power-on. The control temperature for the fixing heater is determined by the temperature of the fixing heater (value of main thermistor TH1) and the number of copies to be made in continuous mode. The control temperature of the fixing heater is determined by any of the following three ways according to the type of developing assembly (black or color).

The copier keeps track of the number of copies made until the power is turned off or the auto shutoff mechanism (about 5 min) is activated, during which time the effective control temperature will not be changed.

a. Black Developing Assembly

	Heater temperature at first press on Copy Start key after power-on	Copies	Control temperature
1	Lower than 100°C	1 to 9	215°C
		10 to 14	210°C
		15 to 19	205°C
		20 to 24	200°C
		25 to 29	195°C
		30 or more	190°C
2	100°C or higher and less than 120°C	1 to 9	205°C
		10 to 14	200°C
		15 to 19	195°C
		20 or more	190°C
3	120°C or higher	1 to 9	195°C
		10 or more	190°C

Table 3-401

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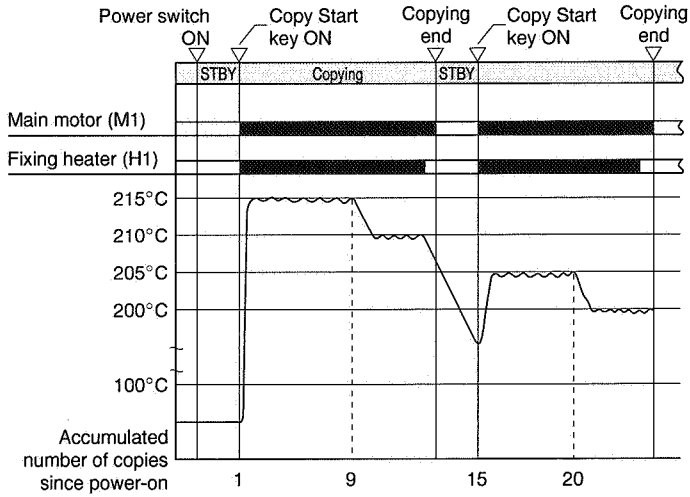

Figure 3-411

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b. Color Developing Assembly

	Heater temperature at first press on Copy Start key after power-on	Copies	Control temperature
1	Lower than 100°C	1 to 4	225°C
		5 to 9	220°C
		10 to 14	215°C
		15 to 19	210°C
		20 to 24	205°C
		25 to 29	200°C
		30 or more	195°C
2	100°C or more and less than 120°C	1 to 4	215°C
		5 to 9	210°C
		10 to 14	205°C
		15 to 19	200°C
		20 or more	195°C
3	120°C or higher	1 to 4	205°C
		5 to 9	200°C
		10 or more	195°C

Table 3-402

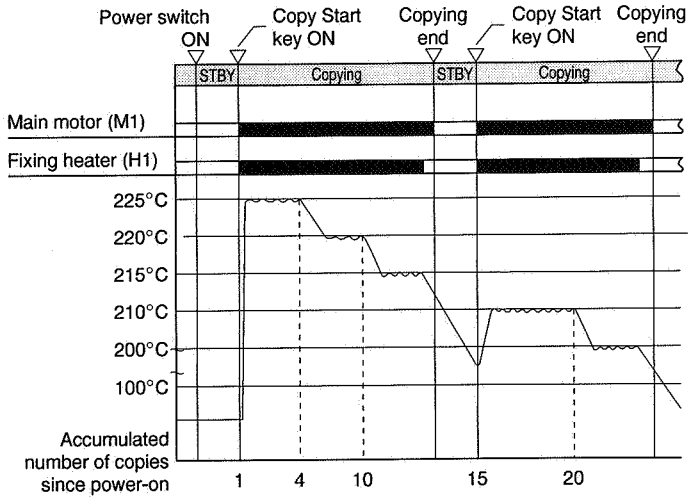

Figure 3-412

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3. Controlling the Power Supply to the Fixing Heater

The temperature of the fixing heater is controlled by controlling the power supplied to the fixing heater.

The power to the fixing heater is controlled by controlling its phase.

The microprocessor on the DC controller PCB controls the output timing of the fixing heater driver signal (HTRD) so that power suited to the target temperature of the fixing heater may be supplied; this is to control the phase of the power supplied to the fixing heater.

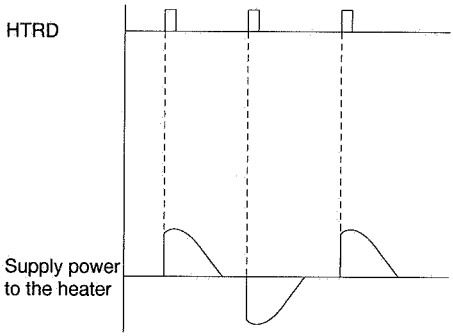

Figure 3-413

4. Correcting the Variation in the Resistance of the Fixing Heater

The plane-shaped heater used as the fixing heater has production variations in its resistance that would hinder proper execution of thermal control of the fixing heater.

To correct possible problems, the copier compensates for the variations in terms of seven settings of the resistance, whose values are read by a microprocessor.

Caution:

The resistance of the fixing heater is decided based on the combination of the jumper wires connected to the connector of the thermistor (TH1); see Figure 3-414.
The resistance is checked and appropriate settings are made at the factory when the fixing assembly is assembled; do not rearrange the jumper wires.

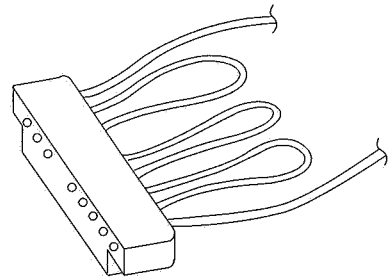

Figure 3-414

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5. Checking for Overheating at the End of the Fixing Heater

The rear end of the copier's fixing heater is equipped with a sub thermistor (TH2) to check for overheating.

The thermistor serves to prevent damage to the fixing film otherwise caused by overcurrent occurring in areas where paper does not come into contact while copies are made continuously on paper of A4 or smaller.

In multifeeder manual mode, if the detected temperature of the main thermistor (TH1) is 190°C or less for the black developing assembly or 195°C or less for the color developing assembly, the distance between sheets of paper is increased (12 to 8 cpm), thereby decreasing the supply power to the fixing heater to prevent overheating at the end of the fixing heater.

Once changed, the distance between sheets of paper is maintained until copying is over.

Should the temperature at the end of the fixing heater still keep rising after increasing the distance between sheets and the sub thermistor (TH2) detects 255°C or more, copying operation is stopped after discharging the ongoing copy; at the same time, 'H' is indicated in the display of the control panel, disabling the Copy Start key.

The 'H' indication turns off automatically when the detection temperature of the sub thermistor (TH2) falls below 240°C, and a press on the Copy Start key then will make the remaining number of copies.

6. Protection Mechanisms

The copier is equipped with the following protection mechanisms to prevent malfunction of the fixing heater:

a. Thermistor (TH1, TH2)

The microprocessor on the DC controller PCB monitors the voltage of the thermistor (TH1, TH2); if it detects a high temperature error or a low temperature error, it sends the fixing heater error signal (HTNG) to the timer circuit and, at the same time, indicates an error code (E00 through E003) on the control panel. In response, the timer circuit sends the relay off signal (RLOFF*) to the auxiliary power supply about 1.5 after it has received the fixing heater error signal (HTNG). The auxiliary power supply in turn turns off the relay (RL601) to turn off the power supply. The data for problems associated with 'E0', i.e., related to the heater, is backed up and 'E0' will be indicated on the control panel next time the power is turned on.

The data, however, is retained only about 5 min; when the power is turned off while 'E000' through 'E003' is indicated on the control panel, 'E0' will be indicated on the control panel if the power switch is turned on within 5 min, and the Copy Start key will not be enabled.

If you have turned on the power switch about 5 min or more after you turned off the power switch while 'E000' through 'E003' is indicated on the control panel, the copier will respond to a press on the Copy Start key. If an error associated with the heater is detected during copying operation, the copier once again will indicate 'E000' through 'E003' on the control panel and will turn itself off.

b. Thermal Fuse (FU1)

If the area around the thermal fuse exceeds 226°C and remains so for a specific period of time, the thermal fuse melts to cut off the power to the fixing heater.

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7. Correcting Displacement of the Fixing Film

a. Outline

The fixing film can become displaced toward the front or the rear as it keeps moving. To correct such displacement, the copier is equipped with a correction mechanism.

The fixing film displacement correction mechanism consists of the following four parts:

- tension roller
- swing arm
- tension wire
- balance spring

Displacement, if any, of the fixing film is corrected by moving the front side of the tension roller up and down by the balance spring and the wire. When the fixing film has become displaced toward the front, the copier lowers the front of the tension roller; when the fixing film has become displaced toward the rear, the copier moves up the front of the tension roller.

The tension roller is designed to stop where the fixing film can move without displacement by the work of the balance spring and the wire.

If the fixing film becomes displaced toward the rear or the front in excess of the range within which displacement is corrected, the fixing film displacement sensor (PS4) turns on. When the sensor (PS4) turns on, the fixing film is stopped and an error code (E0 and 07 alternately flashed) is indicated on the control panel.

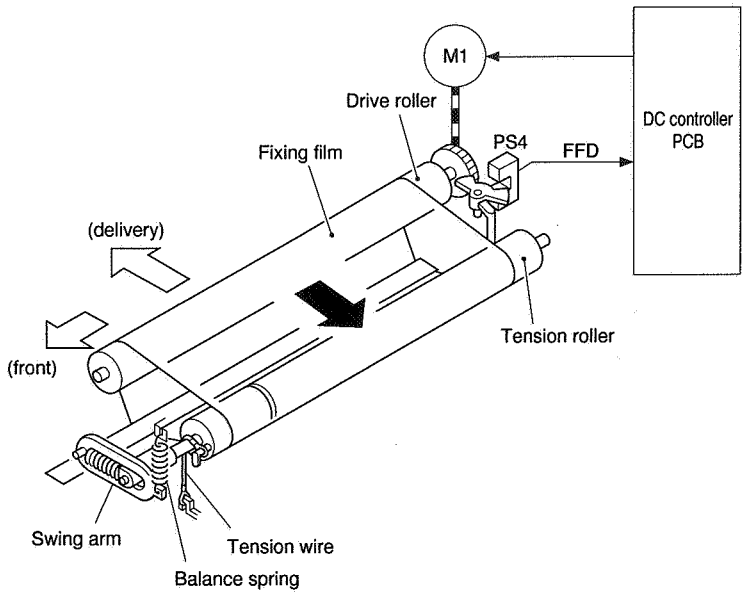

Figure 3-415

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b. Operation

The tension roller consists of an idler roller and a friction roller. The idler roller rotates in relation to the movement of the fixing film; and the friction roller, which is along the same axis as the idler roller, rotates independently of the idler roller. A tension wire is hooked on the peripheral direction of the friction roller shaft, taking in the tension wire for a length corresponding to the rotation force of the friction roller so as to lower the front of the tension roller.

The tension of the tension wire increases or decreases in proportion to the rotation force of the fiction roller. The rotation force of the friction roller increases or decreases in proportion to the area of the fixing film that comes in contact with the friction roller.

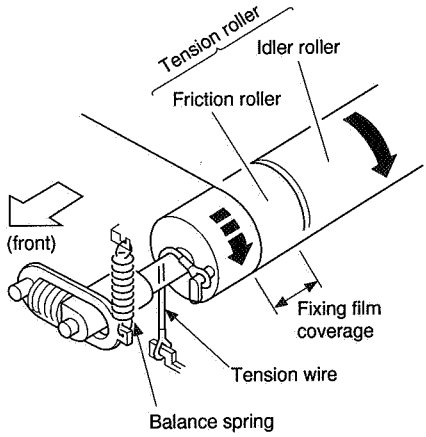

Figure 3-416

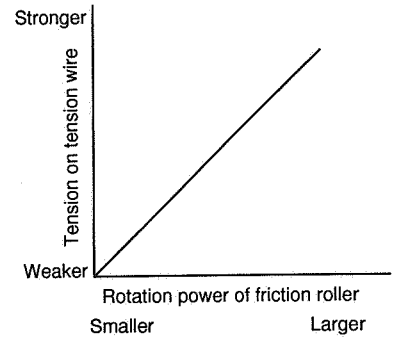

Figure 3-417

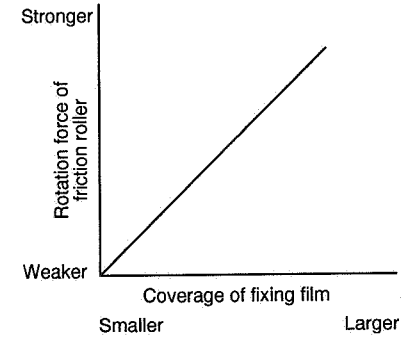

Figure 3-418

When the fixing film becomes displaced toward the rear, the area of the fixing film coming into contact with the fixing film will decrease, thereby decreasing the rotation force of the fixing roller. When the rotation force of the friction roller decreases, the tension of the tension wire decreases, thereby causing the balance spring to lift the front of the tension roller by way of the swing arm.

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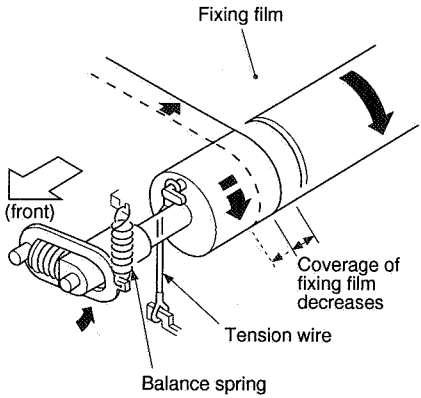

Figure 3-419

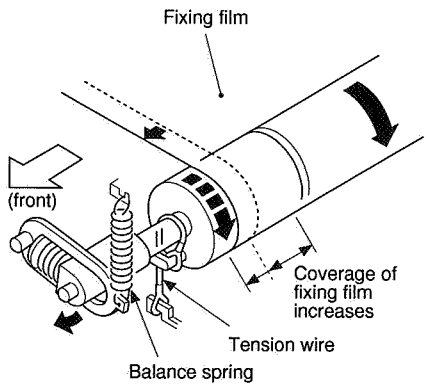

Figure 3-420

The front of the fixing film starts to move toward the front when the front of the tension roller is raised.

As the fixing film moves toward the front, the coverage of the friction roller by the fixing film will become greater to increase the rotation force of the friction roller; the condition will cause the tension wire to move down the front of the tension roller.

As the front of the tension roller is moved down, the tension of the balance spring will increase, and the tension roller will stop where the tension of the tension wire and the tension of the balance spring become balanced.

c. Measures for 'E007'

Use fixing film displacement correction mode if 'E007' is indicated as follows:

1) Turn off the power switch, and leave the copier alone for about 10 min.
   - The temperature of the fixing heater will drop below 100°C.
2) Turn on the power switch.
   - The copier indicates 'C' on the control panel, and the fixing assembly becomes activated moving the fixing film (about 3 min).
3) After 3 min, the 'C' indication on the control panel will disappear when the fixing film returns to its appropriate position, and the copier enters standby state.

If 'E007' does not disappear after executing the above fixing film displacement correction mode, see the instructions under "Correcting the Displacement of the Fixing Film" in the Service Handbook (p.2-10).

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E. Detecting Jams

The copier is equipped with two copy paper sensors to check the presence/absence of copy paper and whether it is moving normally.

- registration sensor (Q751)
- delivery sensor (PS3)

The presence/absence of copy paper or a jam is checked in reference to the presence/absence of copy paper at the respective sensors at such times as stored in the microprocessor in advance.

The copier does not keep a record of the remaining number of copies to make or the copy mode effective at time of a jam so that it will be reset to standard mode when you open the copier to remove jams. The microprocessor has the following five 'no paper/jam' detection sequences, and it also identifies a jam if any of the sensor detects copy paper at power-on.

1. Absence of Paper in the Multifeeder Pick-Up Assembly (pick-up delay jam)

In multifeeder mode, if copy paper does not reach the registration sensor within a specific period of time, the copier identifies a jam, stops the main motor in about 3 sec, and indicates the Add Paper message. If the registration sensor detect copy paper within this 3-min period (approx.), the copier identifies a pick-up delay jam and flashes the Jam message.

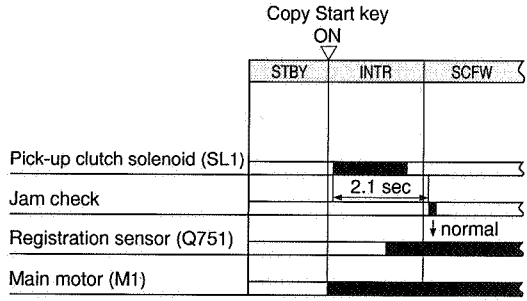

Figure 3-421 (normal)

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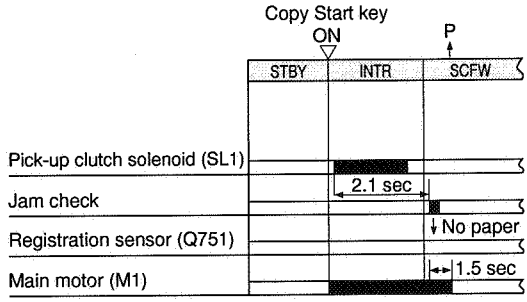

Figure 3-422 (no paper)

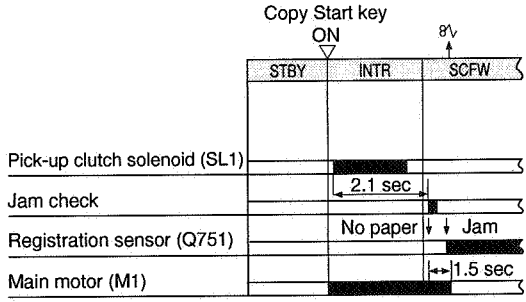

Figure 3-423 (jam)

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2. Cassette/Singlefeeder Pick-Up Delay Jam

a. Cassette Pick-Up Delay Jam

If copy paper does not reach the registration sensor within a specific period of time after the Copy Start key has been pressed, the copier identifies a pick-up delay jam, stops copying operation, and flashes the Jam message.

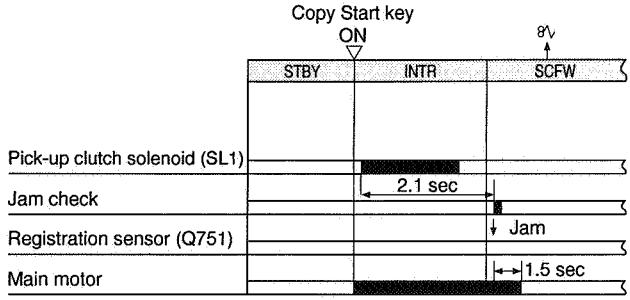

Figure 3-424

b. Singlefeeder Pick-Up Delay Jam

If copy paper does not reach the registration sensor within a specific period of time after paper has been picked up, the copier identifies a pick-up delay jam, stops copying operation, and flashes the Jam message.

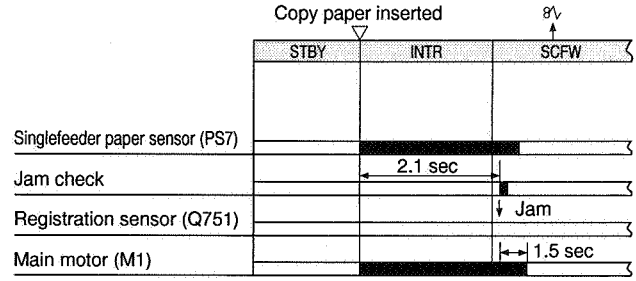

Figure 3-425

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3. Pick-Up Stationary Jam

If copy paper does not move past the registration sensor because of a feeding problem, the copier identifies a pick-up delay jam, stops copying operation, and flashes the Jam message. (This detection is not executed in singlefeeder mode.)

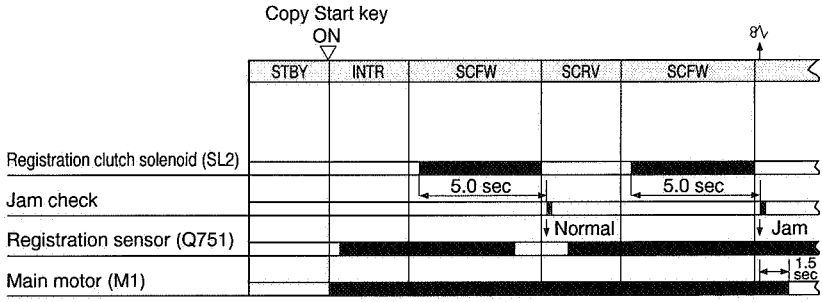

Figure 3-426

4. Delivery Delay Jam

If copy paper does not reach the delivery sensor within a specific period of time because of a feeding problem, the copier identifies a delivery delay jam, stops copying operation, and flashes the Jam message.

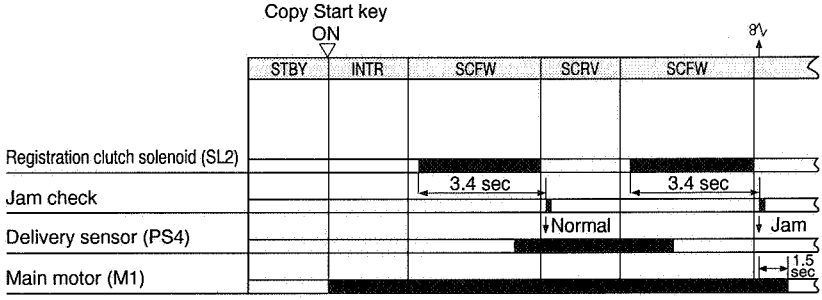

Figure 3-427

5. Delivery Stationary Jam

If copy paper does not reach the delivery sensor within a specific period of time because of a feeding problem, the copier identifies a delivery stationary jam, stops copying operation, and flashes the Jam message.

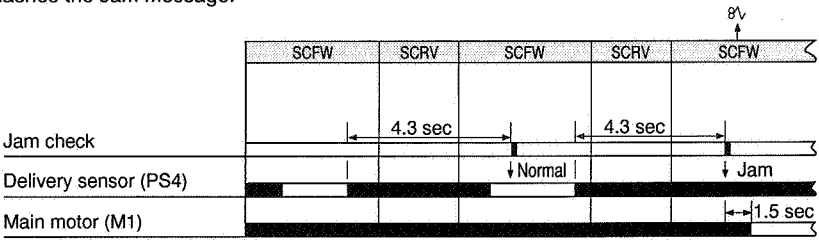

Figure 3-428

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V. FAN

The copier is equipped with one fan which serves to discharge ozone and cool the inside of the machine. The fan is driven directly by the main motor (M1) by means of a belt.

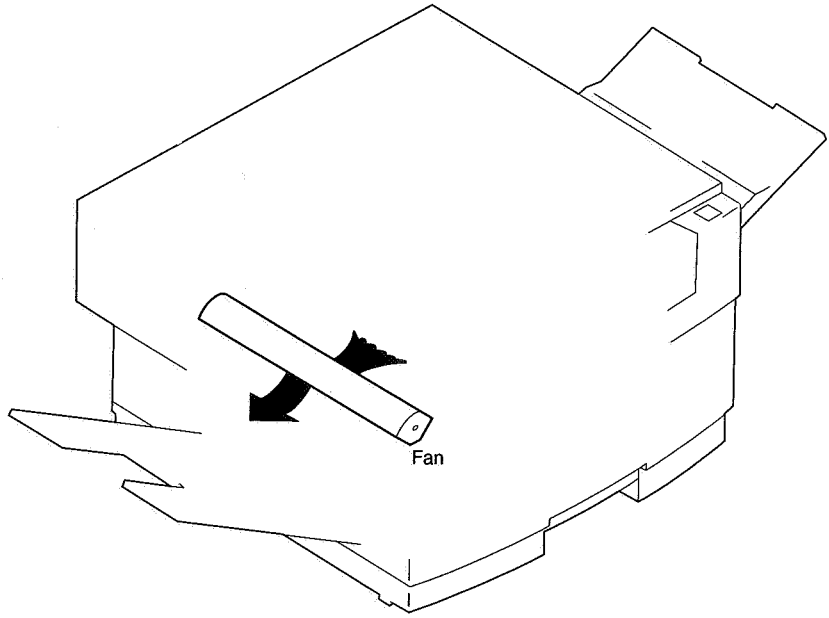

Figure 3-501

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VI. POWER SUPPLY

A. Distribution of Power

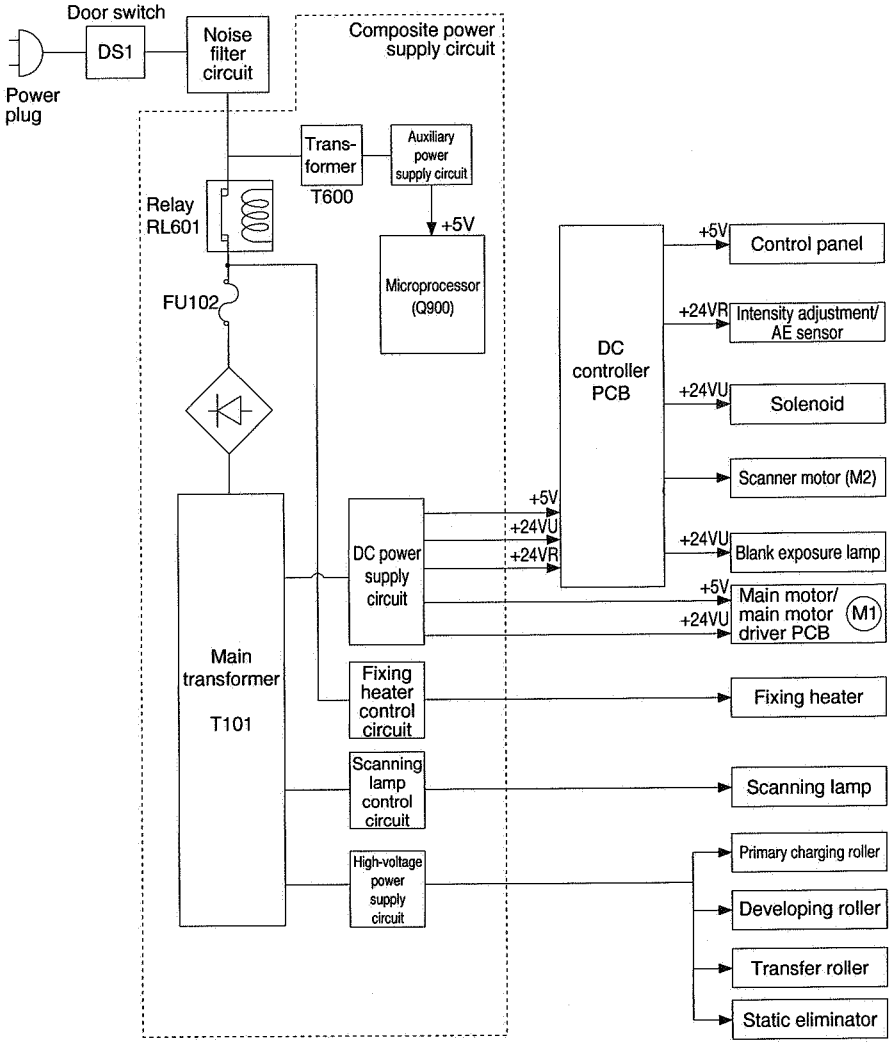

Figure 3-601

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B. Power Supply Circuit

The copier's power supply assembly consists of its DC power supply, scanning lamp power supply, and composite power supply circuit, and uses a single main transfer (T101) to supply high voltage. The copier's power supply is equipped with a microprocessor for exchange of data with the DC controller PCB.

The copier's power switch is a soft switch, and the copier is equipped with an auxiliary power supply to drive the soft switch. The auxiliary power supply provides the microprocessor (Q900) with +5V power while the power plug is connected and the door switch (DS1) is on.

AC power is supplied to the DC power supply assembly when the door switch (DS1) and the power switch on the control panel are turned on. The DC power supply generates +5 V, +24 VR, and +24 VU for the DC controller PCB.

When the power switch is turned off, power to the DC controller PCB is cut; to back up data on error codes (E000, E001, E002, E003), the copier uses the capacitor (C123) located within the DC controller circuit.

When any of these codes (E000, E001, E002, E003) occurs, charges are stored in the capacitor (C123). The copier indicates 'E0' on the control panel if charges exist in the capacitor when the power switch is turned on to indicate that an error associated with the fixing heater is present.

Caution:

The back-up capacitor (C123) keeps charges for about 5 min after the power switch is turned off.

Reference:

The tolerances allowed for the DC voltage are as follows:

- +5 V ±5%
- +24 VR ±5%
- +24 VU ±12.5%

However, the above values apply on the condition that the AC input tolerances are between -15% and +10%.

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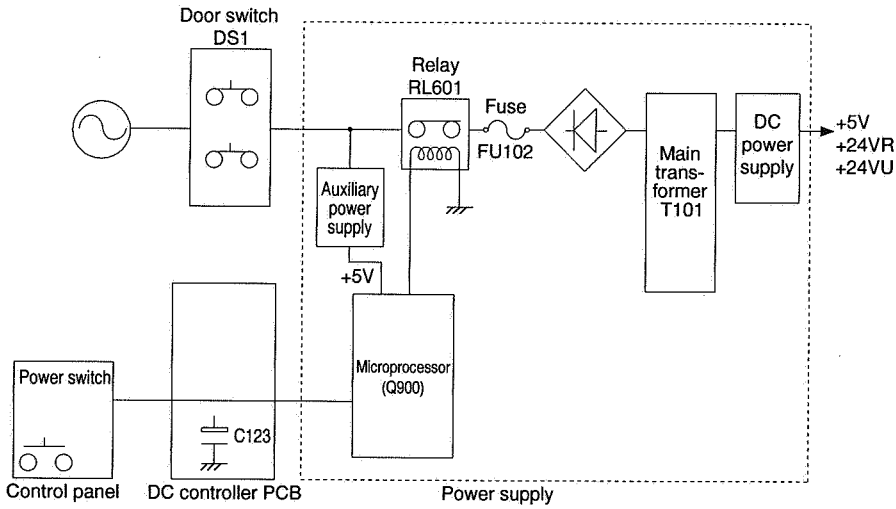

Figure 3-602

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C. Detecting Errors by the Composite Power Supply PCB

The copier's composite power supply PCB is equipped with a microprocessor (Q900) which serves to run a self diagnosis program to check the output from each power supply and its communications with the DC controller PCB.

When an error occurs, the microprocessor communicates with the DC controller PCB so that the results of self diagnosis may be indicated in the display on the control panel.

1. Overcurrent (low voltage)

If the composite power supply PCB finds an error in a DC load, it will turn off the relay (RL601) to cut off the AC input.

2. Error in the Control Value (high voltage)

If the composite power supply PCB finds that the difference between the setting and the actual value of either of the following voltages is not as specified, it will indicate 'E064' on the control panel.

- primary DC bias
- developing DC bias
- transfer bias

3. Error in the Control Value (low voltage)

If the composite power supply PCB finds that the difference between the setting for +24 V of the DC output and the control value is not as specified, it will indicate 'E803' on the display of the control panel.

4. Error in the Communication with the DC Controller

If the DC controller PCB finds an error in the communication between the DC controller PCB and the composite power supply PCB, 'E240' will appear in the display of the control panel for about 4 sec; thereafter, the relay (RL601) is turned off to cut off the AC input.

D. Protection Mechanism of the Power Supply Circuit

The composite power supply PCB has an overcurrent detection function which turns on to stop the output.

When the output has stopped, it may be reset by opening the copier's top unit, correcting the load, and turning on the power switch.

The built-in fuse (FU102), however, will blow if loads are repeatedly short circuited and reset.

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VII. STANDARDS AND ADJUSTMENTS

1. Actions to Take After Replacement

Part	Work
Scanning lamp	1. adjust the intensity of the scanning lamp 2. execute AE adjustment
Intensity/AE sensor PCB	1. adjust the intensity of the scanning lamp 2. execute AE adjustment
Composite power supply PCB	1. adjust the intensity of the scanning lamp 2. execute AE adjustment
DC controller PCB	1. adjust the intensity of the scanning lamp 2. execute AE adjustment 3. adjust the leading edge non-image width 4. image leading edge margin 5. fine-adjust reproduction ratio

Table 3-701

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2. Adjusting the Intensity of the Scanning Lamp

Adjust the intensity of the scanning lamp whenever you have replaced any of the following parts:

- DC controller PCB
- composite power supply PCB
- AE/intensity sensor PCB
- scanning lamp

Preparing for Adjustment

1) Set the black cartridge in the copier.
2) Set the density correction switch (SW101) to the center notch.

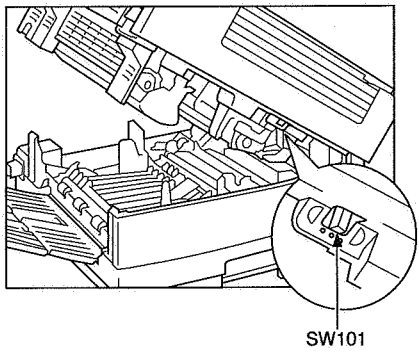

Figure 3-701

3) Turn off the AE mechanism, and set the copy density adjusting lever to the center notch.
4) Place the Test Chart (NB-3, NA-2, NA-3) on the copyboard, and make copies.
5) Turn VR101 on the DC controller PCB fully counterclockwise.
6) Turn VR101 on the DC controller PCB so that gray scale No. 9 is barely visible.

Caution:

- Check gray scale No. 10 if you are using NB-3.
- If you have turned VR101 fully clockwise, turn it fully counterclockwise before making adjustments once again.

Direction of VR101 and Copy Density

Direction	Density
Clockwise	Darker
Counterclockwise	Lighter

Table 3-702

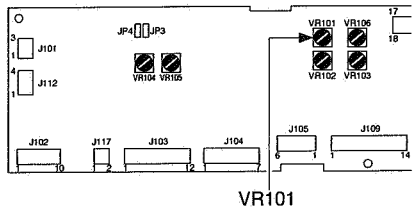

Figure 3-702

3. AE Adjustment

Execute AE adjustment whenever you have replaced any of the following parts:

- DC controller PCB
- Composite power supply PCB
- AE/intensity sensor PCB
- scanning lamp

Preparing for Adjustment

- Obtain a newspaper with even density; avoid one with photos and large titles.
- Obtain five sheets of copy paper.
- Make sure that the intensity of the scanning lamp has been properly adjusted.

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1) Short the two jumper wires (JP3, JP4) on the DC control PCB with a screwdriver.

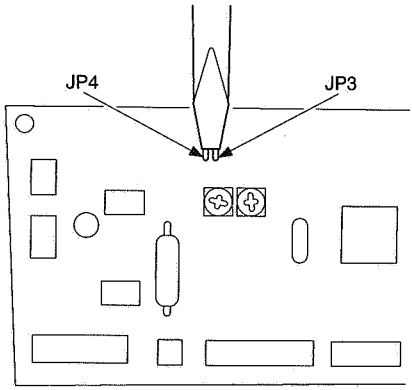

Figure 3-703

2) While shorting the terminals, turn on the power switch.
   - The scanning lamp will turn on, and the main motor (M1) will start to rotate.
3) Stop shorting the two jumper wires (JP3, JP4).
4) Turn VR103 on the DC controller PCB fully clockwise.

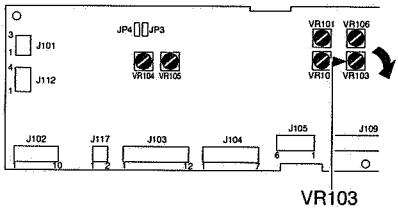

Figure 3-704

5) Place a newspaper on the copyboard, and close the copyboard cover.
6) Adjust VR102 so that the indication in the display is b2 through bc.

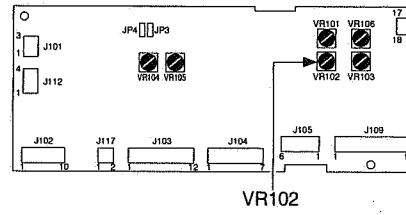

Figure 3-705

7) Remove the newspaper from the copyboard, and place a stack of five sheets of copy paper on the copyboard glass in its place; then, close the copyboard glass.
8) Adjust VR103 on the DC controller PCB so that the indication on the control panel is 53 through 5d.

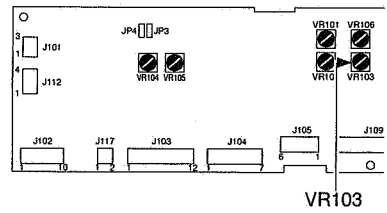

Figure 3-706

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9) Make a copy, and make sure that it is free of fogging yet its text is dark enough.
   - If the copy is foggy or the text density is too light, repeat starting with step 1).
   - If no change is noted in the results after re-adjustment, make further adjustments using the density correction switch (SW101).

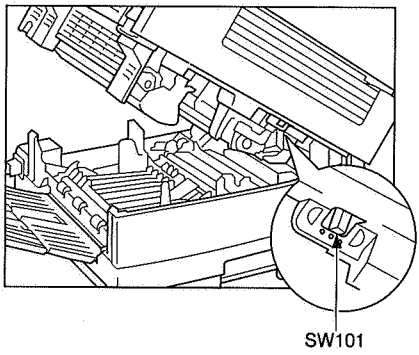

Figure 3-707

4. Adjusting the Leading Edge Non-Image Width

Adjust the leading edge non-image width whenever you have replaced the following:
- DC controller PCB

Preparing for Adjustment

Make sure the leading edge non-image width is 2.0 ±1.0 mm when the Test Chart is copied.

Figure 3-708

1) Turn VR105 on the DC controller PCB so that the standard is met.

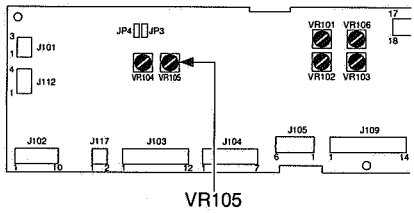

Figure 3-709

Direction of VR105 and Leading Edge Non-Image Width

Direction	Width
Clockwise	Increases
Counterclockwise	Decreases

Table 3-703

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5. Adjusting the Leading Edge Margin (registration on timing)

Adjust the leading edge margin whenever you have replaced the following:

- DC controller PCB

Preparing for Adjustment

Make sure that the leading edge margin is 0.2 to 5.0 mm when the Test Chart is copied.

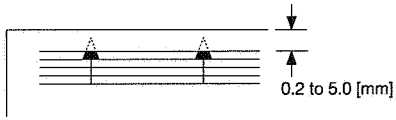

Figure 3-710

1) Turn VR104 on the DC controller PCB so that the standard is met.

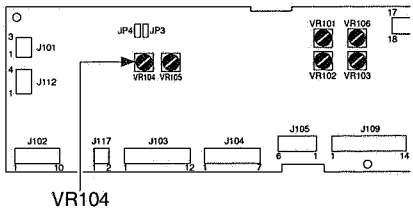

Figure 3-711

Direction of VR104 and Leading Edge Margin

Direction	Margin
Clockwise	Increases
Counterclockwise	Decreases

Table 3-704

6. Fine-Adjusting the Reproduction Ratio

Fine adjust the reproduction ratio whenever you have replaced the following:

- DC controller PCB

Preparing

Obtain a multimeter.

1) Before replacing the DC controller PCB, turn on the power switch, and connect the probes to the CP23 and GND of the printed pattern on the DC controller PCB; then, measure the voltage.
   + probe.....CP23
   - probe .....GND

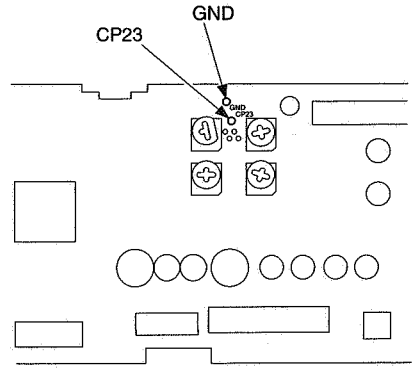

Figure 3-712

2) After replacing the DC controller PCB, measure the voltage as in step 1); then, turn VR106 so that the reading is the same as before replacement.

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7. Checking the Photointerrupters

1) Set the meter to the 12VDC range.
2) Connect the - probe of the meter to GND of the printed pattern on the DC controller PCB.

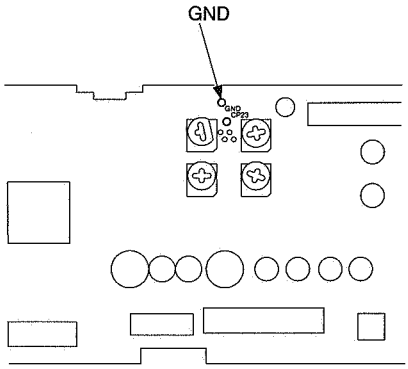

Figure 3-713

3) Make checks according to the instructions.

Reference:

The photointerrupters other than those indicated are connected in a matrix.

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No.	PS1		PS2	
Name	Scanner home position sensor (SCHP)		Lens home position sensor (LHP)	
+ probe	J101-1		J109-9	
Normal if as described	Move the scanner by hand while in standby.		Move the lens mount by hand while in standby	
	When the scanner is at home position	When the scanner is not at home position	When the light-blocking plate is over the sensor	When the light-blocking sensor is not over the sensor
Voltage measured by meter (approx.)	0 V	5 V	0 V	5 V

No.	PS4		Q751	
Name	Belt displacement sensor (FFD)		Pre-registration roller sensor (RPD)	
+ probe	J112-1		J108-4	
Normal if as described	Move the detecting lever by hand while in standby		Move the detecting lever by hand while in standby	
	When the light-blocking plate is over the sensor	When the light-blocking sensor is not over the sensor	When the detecting lever is not moved	When the detecting lever is not moved
Voltage measured by meter (approx.)	0 V	5 V	5 V	0 V

Table 3-705

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VIII. SELF DIAGNOSIS

The copier's DC controller PCB is equipped with a microprocessor that checks the state of the machine (sensors in particular); when it identifies an error, it indicates it in the copy counter on the control panel.

In the case of 'E001', 'E0' and '01' are flashed alternately.

Code	Cause	Description
C	Indicated when the fixing film is being corrected for displacement.	• The fixing film displacement sensor (PS4) detects the fixing film at power-on and, in addition, the thermistor (TH1) temperature is less than 100°C.
H	Fixing heater (overheating)	• The thermistor (TH2) temperature exceeds 225°C during copying operation.
E0	Problems associated with 'E000', 'E001', 'E002', or 'E003' has occurred.	• The power switch has been turned off and on immediately after an error (E000, E001, E002, E003).
E000	• Thermistor (TH1, TH2; faulty) • Fixing heater (H1; faulty) • Thermal fuse (FU1; melted) • Triac (faulty) • DC controller PCB (faulty)	• The thermistor (TH1) temperature fails to reach 65°C 1.5 sec after a press on the Copy Start key. • The thermistor (TH1) temperature fails to reach 150°C in 4 sec after a press on the Copy Start key. • The thermistor (TH2) temperature fails to reach 65°C in 4 sec after a press on the Copy Start key.

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Code	Cause	Description
E001	• Thermistor (TH1, TH2; faulty) • Triac (faulty) • DC controller PCB (faulty)	• The thermistor (TH1) temperature exceeds 245°C during copying operation. • The thermistor (TH1) temperature exceeds the control temperature by 30°C after a press on the Copy Start key. • The thermistor (TH2) temperature exceeds 275°C during copying operation. • The thermistor (TH1) detects a temperature increase of 100°C or more within 1 sec. • The thermistor (TH1) detects a temperature increase of 40°C or more during standby after it has reached 100°C. • The thermistor detects a temperature increase of 40°C after it has reached 130°C.
E002	• Thermistor (TH1; faulty) • Fixing heater (H1; faulty) • Thermal fuse (FU1; melting) • Triac (faulty) • DC controller PCB (faulty)	• The temperature detected by the thermistor (TH1) has exceeded 150°C during copying operation and maximum power is applied for 10 to 14 sec thereafter.
E003	• Thermistor (TH1; faulty) • Fixing heater (H1; faulty) • Thermal fuse (FU1; melting) • Triac (faulty) • DC controller PCB (faulty)	• The thermistor (TH1) temperature exceeds 190°C during copying and then drops 170°C or less for 0.1 sec or more.
E007	• Fixing heater film (displaced, torn)	• The output of the fixing film displacement sensor (PS5; '1') continues 100 ms or more while the main motor (M1) is operating. • The fixing film cannot be corrected for displacement when fixing film displacement correction mode is executed at power-on.
E010	• Main motor (M1; faulty) • DC controller PCB (faulty)	• The revolution of the main motor deviates from the specification for 1 sec or more while the main motor drive signal (MMD=1) is being generated, i.e., remains MLOCK=0.
E064	• Composite power supply PCB • DC controller PCB (faulty)	• The actual output differs from the specified output for the high-voltage output of the composite power supply.

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Code	Cause	Description
E202 (keys on control board locked)	• Scanner home position sensor (PS1; faulty) • Scanner motor (M2; faulty) • DC controller PCB (faulty)	• The lens home position cannot be detected after the lens has traveled over its maximum distance. • The lens does not leave the lens home position.
E210	• Lens home position sensor (faulty) • Scanner motor (faulty) • Lens cable • DC controller PCB (faulty)	• The lens home position cannot be detected after the lens has traveled over its maximum distance. • The lens does not leave the lens home position.
E220	• Scanning lamp • Intensity sensor PCB (faulty) • DC controller PCB (faulty) • Composite power supply PCB (faulty)	• Intensity adjustment fails to end within 10 sec after the scanning lamp has turned on. • The scanning lamp remains on for 5 sec during standby. • The scanning lamp remains off for 5 sec during copying.
E240	• DC controller PCB (faulty) • Composite power supply (faulty)	• An error is detected in the communication between the DC controller PCB and the composite power supply PCB.
E261	• Power supply frequency (faulty) • Composite power supply PCB (faulty)	• The intervals in the zero-cross signals is greater than allowed.
E803	• DC controller PCB (faulty) • Composite power supply PCB (faulty) • Scanning lamp (faulty)	• The +24V power supply deviates from the control value by ±20% during copying.

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CHAPTER 4

MECHANICAL SYSTEM

1. **Disconnect the power cord for safety before disassembly or reassembly work.**
2. **Group the screws by type (length and diameter) and location.**
3. **The fixing screw for the grounding wire and varistors is fitted with a washer to ensure electric continuity; be sure to use the washer for reassembly.**
4. **If possible, avoid operating the machine with any of its parts removed.**
5. **Unless otherwise noted, reassembly is the reverse of disassembly.**

I. EXTERNALS 4-1
II. DRIVE SYSTEM 4-5
III. PICK-UP/FEEDING SYSTEM 4-17
IV. EXPOSURE SYSTEM 4-26
V. CHARGING, DEVELOPING, AND CLEANING SYSTEMS 4-28
VI. FIXING SYSTEM 4-30
VII. ELECTRICAL SYSTEM 4-33

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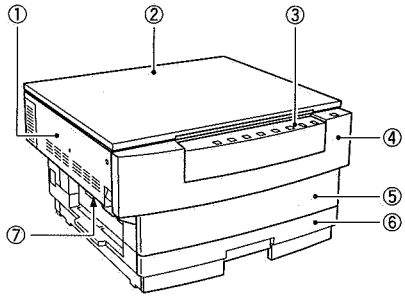
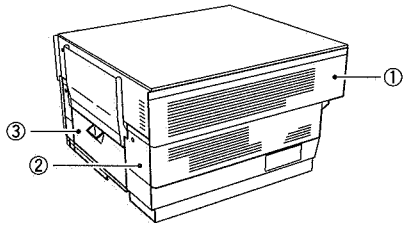
I. EXTERNALS

A. External Covers



① Upper cover
② Copyboard cover
③ Control panel
④ Upper front cover
⑤ Lower front cover
⑥ Cassette
⑦ Left cover

Figure 4-101



① Rear cover
② Multifeeder/singlefeeder cover
③ Right cover

Figure 4-102

Caution:

Remove the covers as necessary to clean, check, or repair the inside of the machine.
Covers that may be detached by mere removal of the mounting screws are omitted from the discussions.

1. Removing the Upper Cover

1) Remove the copyboard cover.
2) Open the copier's top unit.
3) Remove the two screws ①, and remove the front upper cover ②.

Caution:

The flexible cable for the control panel is connected to the front upper cover; disconnect the flexible cable from the DC controller.

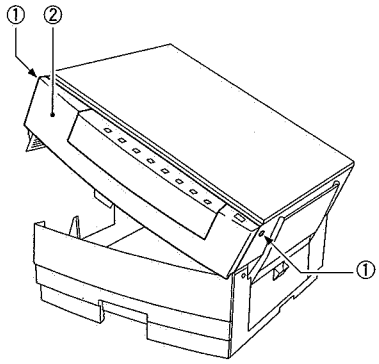


Figure 4-103

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4) Disengage the two claws ③, and slide the left cover ④ down to remove.

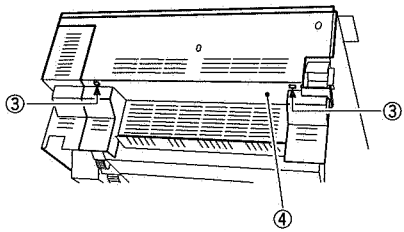

Figure 4-104

5) Remove the screw ⑤, and free the four claws ⑥; then, remove the rear cover ⑦.

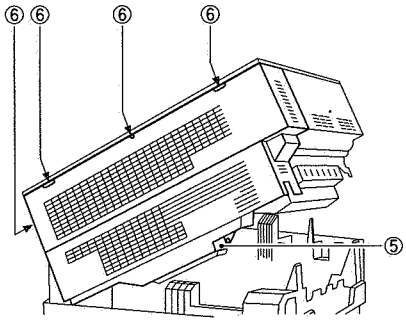

Figure 4-105

6) Remove the screw ⑧, and remove the copyboard cover support retainer ⑨.

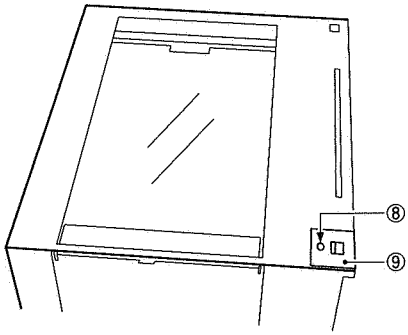

Figure 4-106

7) Lift the top cover ⑩ to remove.

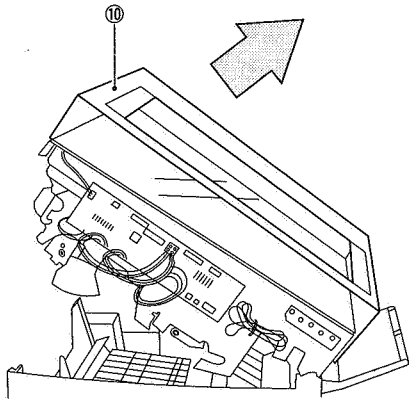

Figure 4-107

2. Removing the Front Lower Cover

1) Remove the top cover.
2) Open the right cover ①, and remove the two screws ②; then, remove the multi-feeder/single feeder unit.

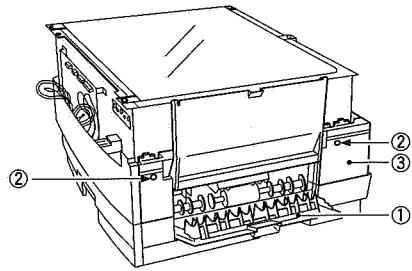

Figure 4-108

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3) While disengaging the three claws ④, remove the lower front cover ⑤.

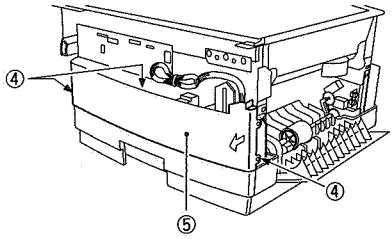

Figure 4-109

Caution:

When installing the multifeeder, go through the following steps:

1) Turn on the power switch, and select multifeeder mode; then, press the Copy Start key.
2) When the pick-up gear unit has risen to its topmost position, turn off the power switch.

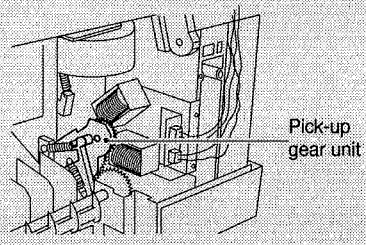

Figure 4-110

3) After installing the multifeeder unit, select multifeeder mode and make one copy.

B. Control Panel

1. Removing the Control Panel

1) Open the copier's top unit.
2) Remove the two screws ①, and remove the front upper cover ②.

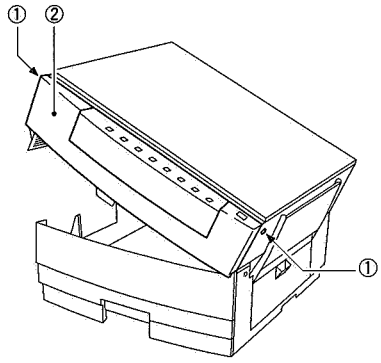

Figure 4-111

3) Disengage the three claws ③, and remove the control panel cover ④.

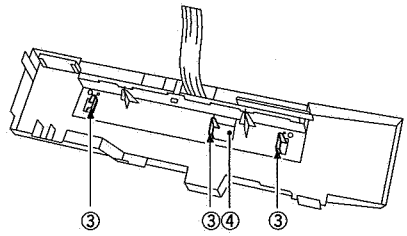

Figure 4-112

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4) Disengage the claw ④, and remove the power switch PCB ⑤.

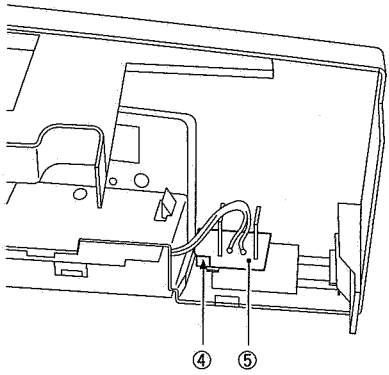

Figure 4-113

5) Move the density adjusting lever ⑥ to the right; then, disengage the claw ⑦, and remove the control panel ⑧.

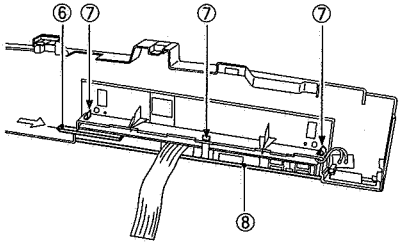

Figure 4-114

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II. DRIVE SYSTEM

A. Scanner Drive Assembly

1. Removing the Scanner Drive Motor

1) Remove the top cover.
2) Open the right door ①, and remove the two screws ②; then, remove the multi-feeder unit ③.

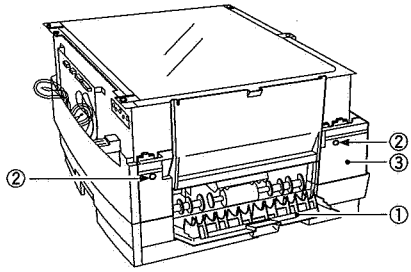

Figure 4-201

3) Loosen the two screws ④, and remove the copyboard glass ⑤.

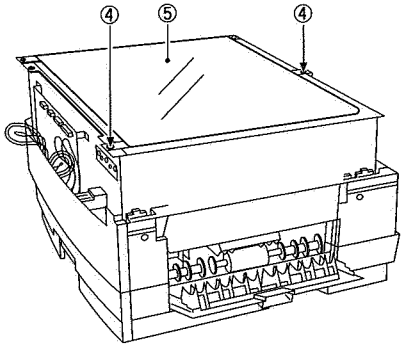

Figure 4-202

4) Remove the four screws ⑥, and remove the lens cover ⑦.

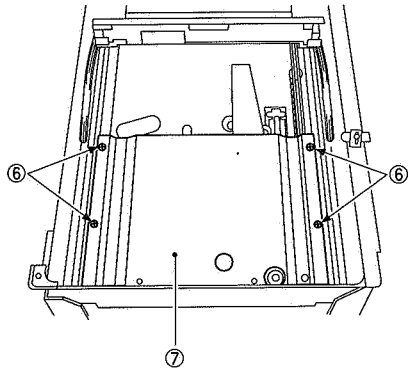

Figure 4-203

5) Open the copier's top unit further, and fix it in position using the grip of a screwdriver or the like (30 mm dia.).

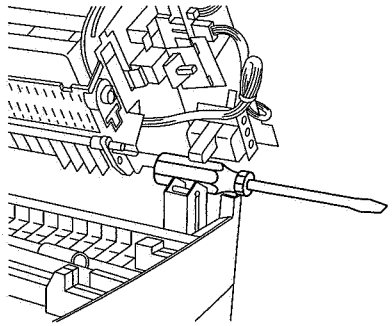

Figure 4-204

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6) Remove the two fixing screws ⑧ for the scanner drive motor.

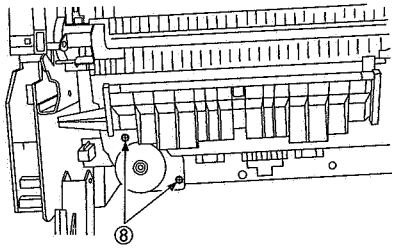

Figure 4-205

7) Free the copier's top unit by removing the screwdriver, and close it.
8) Remove the E-ring ⑨, and lift the cable drive pulley ⑩ slightly to remove the scanner drive motor ⑪.

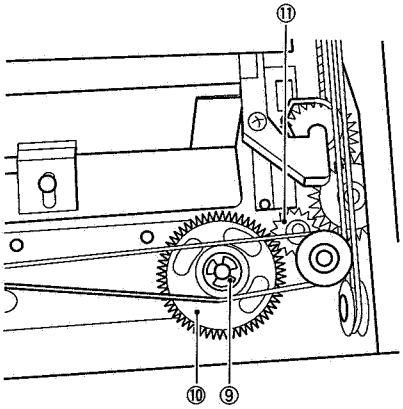

Figure 4-206

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2. Routing the Scanner Drive Cable

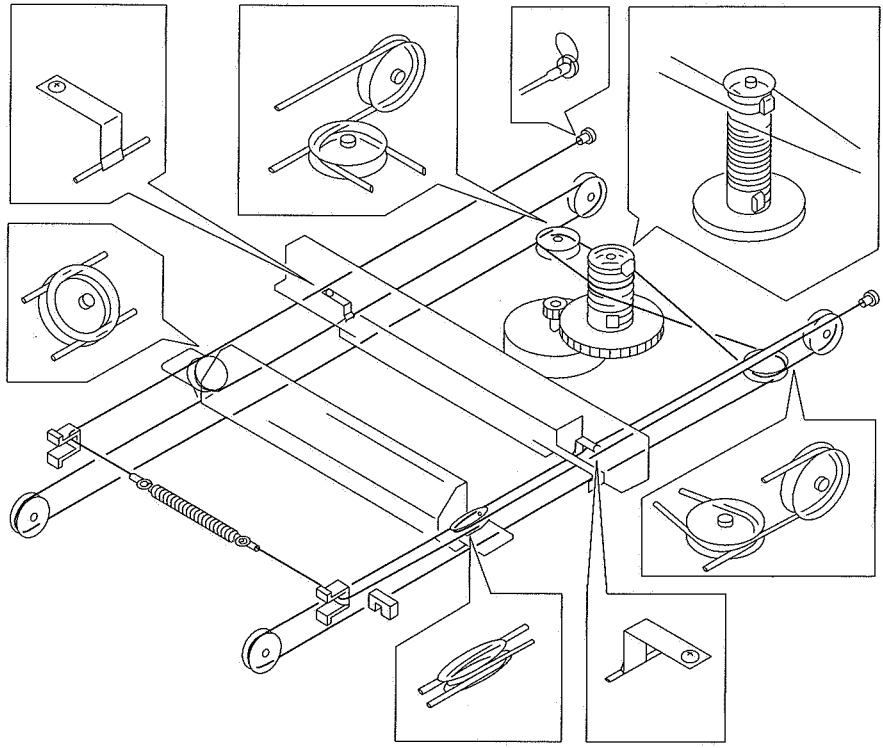

Figure 4-207

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Prepare the following tools.

- mirror positioning tool (FY9-3009-020)
- adhesive tape

1) Adjust the mirror positioning tool to suit the copier.

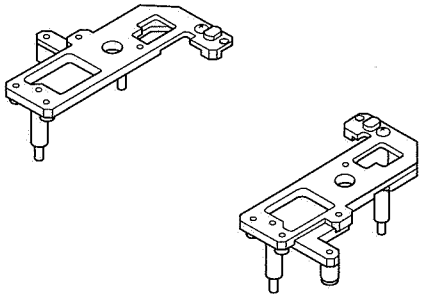

Figure 4-208

2) Cut about ten lengths (about 20×20 mm) of adhesive tape.
3) Remove the copyboard cover.
4) Remove the copyboard glass.
5) Remove the top cover.
6) Remove the two screws ①, and remove the crossmember ②.

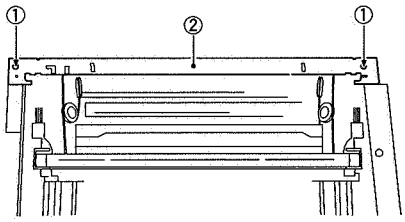

Figure 4-209

7) Remove the four screws ③, and remove the lens cover ④.

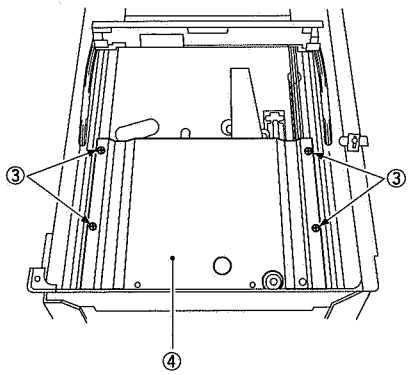

Figure 4-210

8) Wind the reversing cable ⑥ around the cable drive pulley ⑤ 7.5 times with the short end at the top; then, tape it in position.

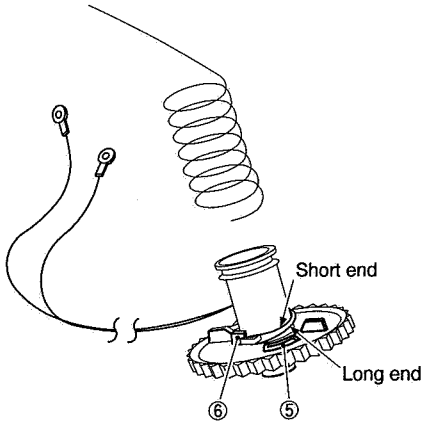

Figure 4-211

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9) Insert the cable drive pulley ⑤ into the shaft ⑥; then, fix it in position using an E-ring ⑦.
(Make sure that the hook is toward the front.)

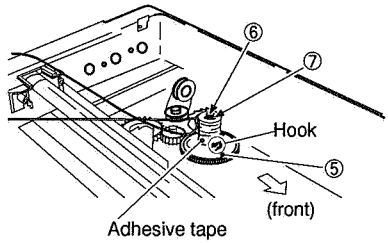

Figure 4-212

10) Fix the short end ⑧ of the cable in place temporarily with adhesive tape ⑨; then, hook the long end ⑩ of the cable on the pulley as shown and fix it in position with adhesive tape ⑪.

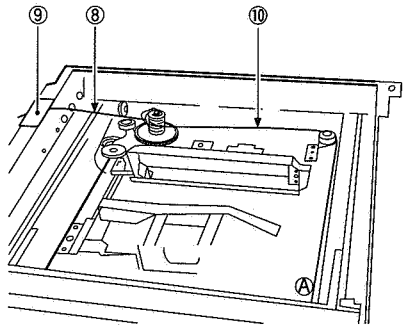

Figure 4-213

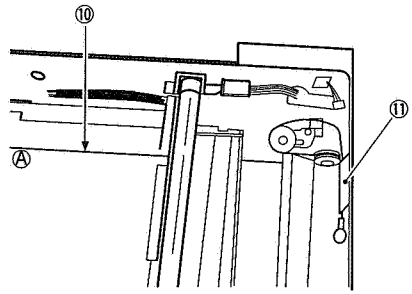

Figure 4-214

11) Free the short end ⑧ of the cable; then, hook the cable as shown and fix it in position with adhesive tape ⑫.

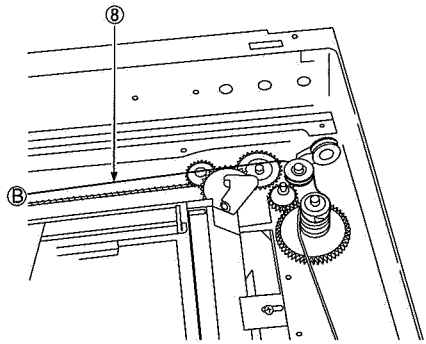

Figure 4-215

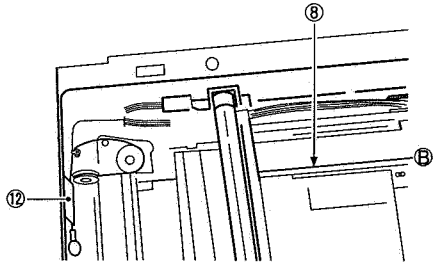

Figure 2-216

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12) Remove the adhesive tape from the cable drive pulley ⑤, and hook the forward cable with its short end ⑬ at the bottom; wind it once, and fix the short end in position temporarily with adhesive tape ⑭.

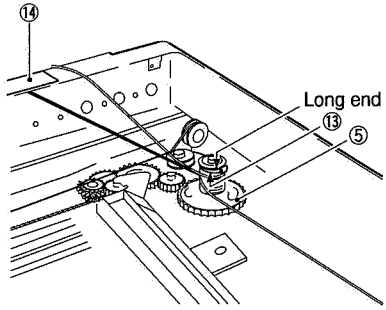

Figure 4-217

13) Hook the long end ⑮ of the forward cable on the pulley as shown, and fix the rear end in position.

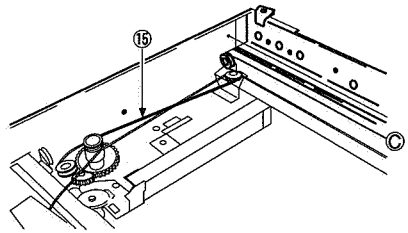

Figure 4-218

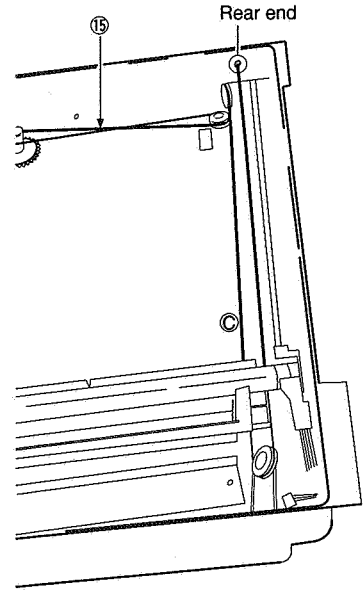

Figure 4-219

14) Fix the short end ⑧ of the cable in position temporarily, and hook the cable as shown and fix the rear end in position.

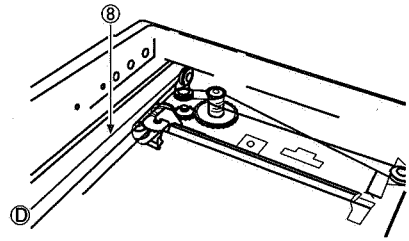

Figure 4-220

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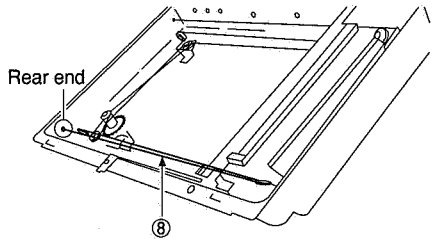

Figure 4-221

15) Free the reverse cable, and hook the spring ⑯.

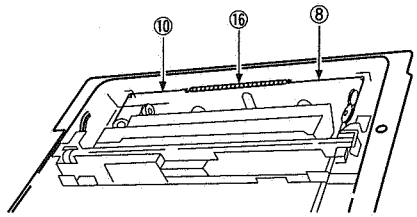

Figure 4-222

16) Fix the rear and the front of the No. 1 mirror mount ⑰ temporarily in position.

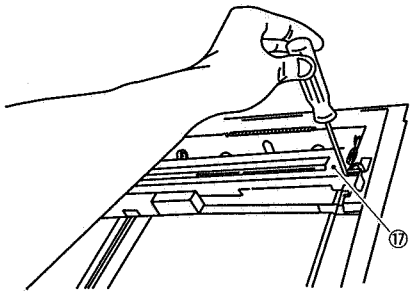

Figure 4-223 (rear)

17) Turn the cable drive pulley ⑤ so that the shaft of the mirror positioning tool ⑱ fits in the positioning hole in the No. 2/3 mirror mount ⑲.

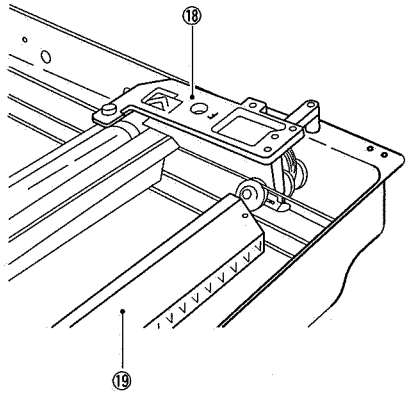

Figure 4-224 (front)

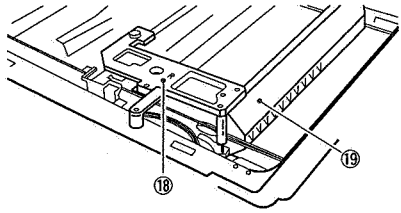

Figure 4-225 (rear)

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18) Fit the shaft of the mirror positioning tool ⑱ into the positioning hole in the No. 1 mirror mount ⑰.

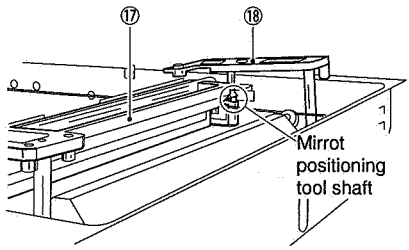

Figure 4-226 (front)

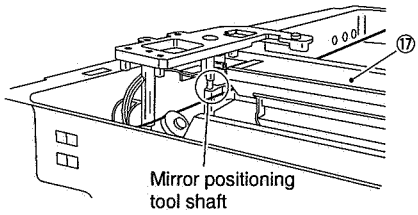

Figure 4-227 (rear)

19) Fix the rear and the front of the No. 1 mirror mount ⑰ in position.

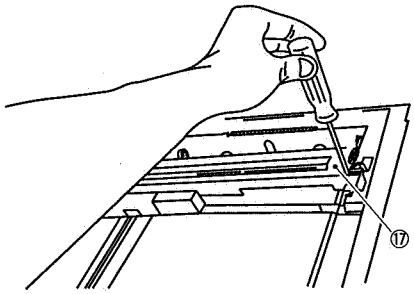

Figure 4-228 (rear)

B. Lens Drive Assembly

1. Removing the Lens Cable

1) Select DIRECT mode, and disconnect the power plug.
2) Remove the copyboard cover.
3) Remove the top cover.
4) Remove the main drive assembly. (See "2. Removing the Main Drive Assembly.")
5) Remove the four screws ①, and remove the lens cover ②.

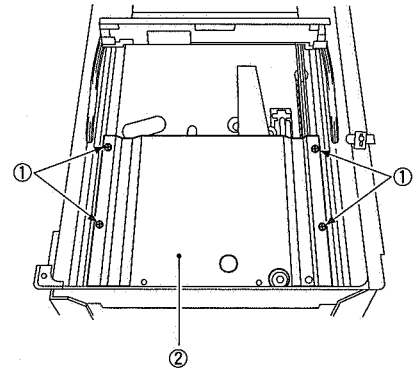

Figure 4-229

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6) Put a marking ⑤ where the cam gear ③ and the drive gear ④ are engaged.

Caution:
During assembly, make sure that the cam gear and the drive gear are engaged with reference to the marking.

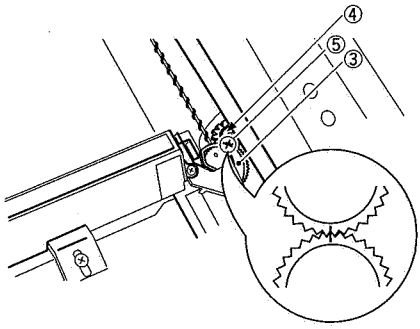

Figure 4-230

7) Put a marking ⑧ on the lens cable fixing plate ⑥ and the lens mount ⑦.

Caution:
During assembly, make sure that the lens cable fixing plate and the lens mount are positioned with reference to the markings.

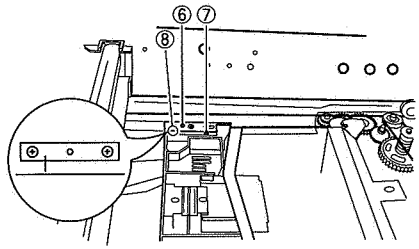

Figure 4-231

8) Disengage the No. 4/5 mirror mount ⑨ and the cam ⑩.

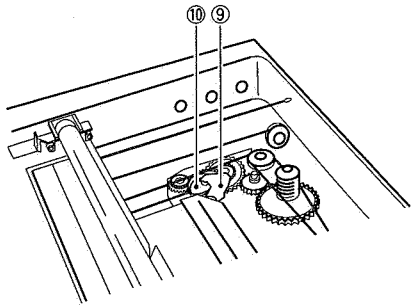

Figure 4-232

9) Remove the screw ⑪, and remove the cam gear ③.

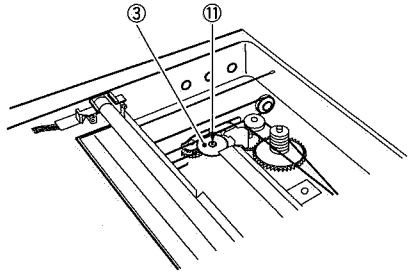

Figure 4-233

10) Remove the spring ⑬ from the tensioner ⑫.

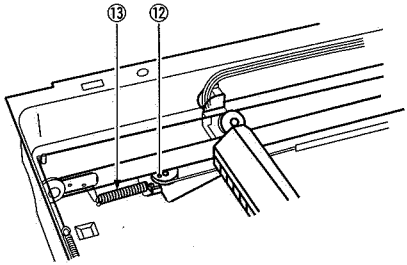

Figure 4-234

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11) Remove the screw ⑭, and remove the lens cable fixing plate ⑥.

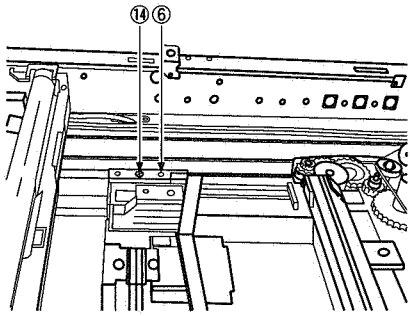

Figure 4-235

12) Remove the lens cable from the lens cable ⑮ fixing plate ⑥; then, pull out the lens cable.

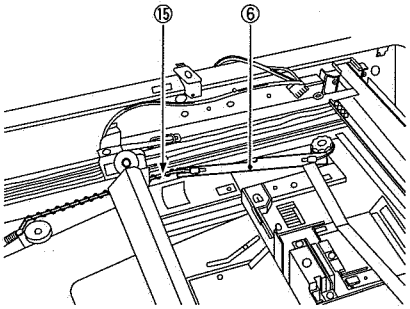

Figure 4-236

C. Main Motor/Main Drive Assembly

1. Removing the Main Motor Unit

1) Remove the top cover.
2) Disconnect the ten connectors ② from the composite power supply PCB ①.

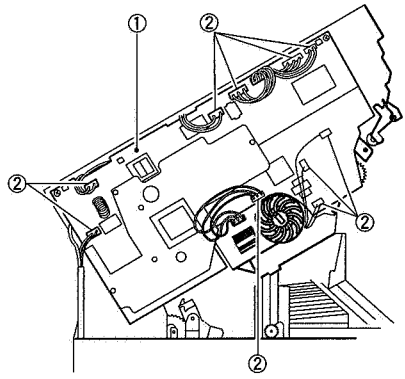

Figure 4-237

3) Remove the seven screws ③; then, while disengaging the claw ④, remove the composite power supply PCB ①.

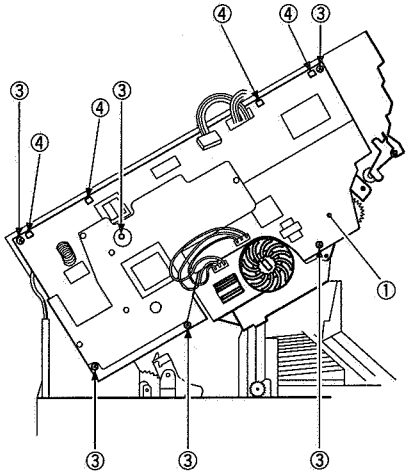

Figure 4-238

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4) Remove the insulating sheet ⑤.

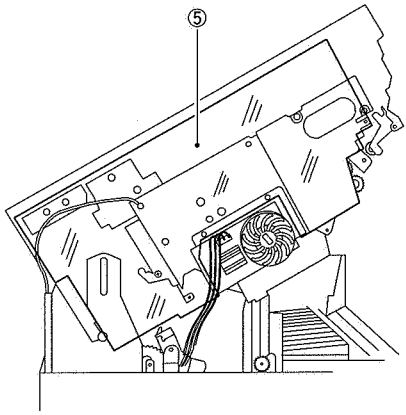

Figure 4-239

5) Remove the screw ⑥, and remove the top high-voltage terminal unit ⑦.

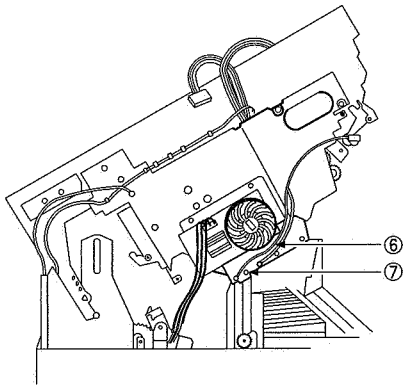

Figure 4-240

6) Remove the four screws ⑧, and remove the main motor unit ⑨.

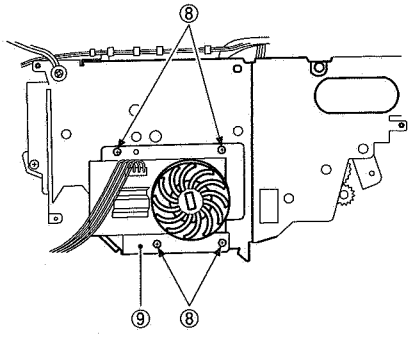

Figure 4-241

Caution:
When installing the main motor unit, be sure to attach the fan belt. After attaching the fan belt, make sure that the belt is free of twists.

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2. Removing the Main Drive Assembly

1) Remove the top cover.
2) Disconnect the ten connectors ② from the composite power supply PCB ①.

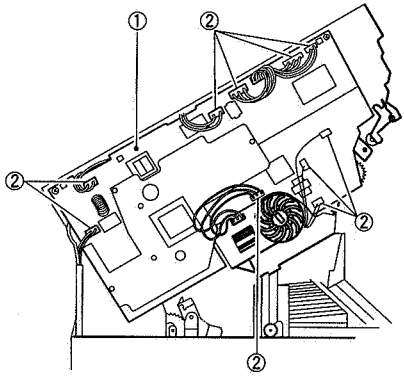

Figure 4-242

3) Remove the seven screws ③; then, while disengaging the claw ④, remove the composite power supply PCB ①.

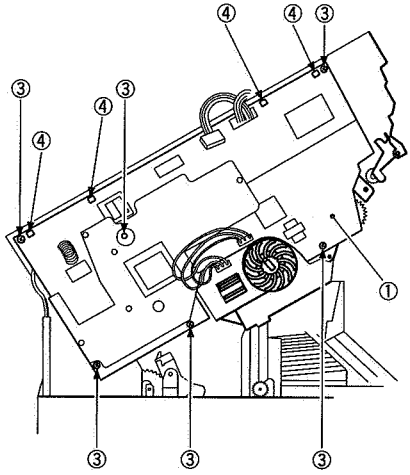

Figure 4-243

4) Remove the insulating sheet ⑤.

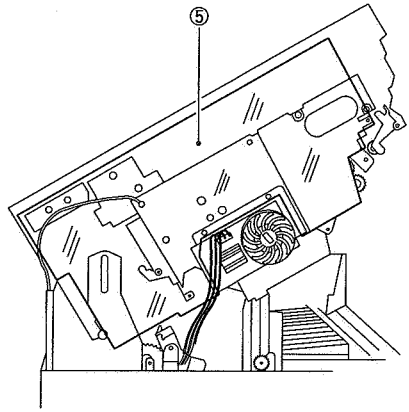

Figure 4-244

5) Remove the screw ⑥, and remove the grounding wire ⑦.

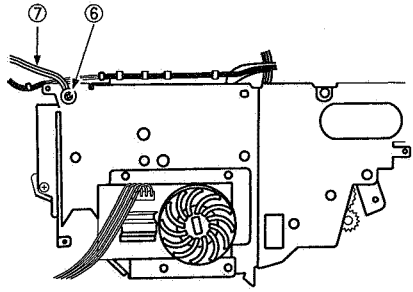

Figure 4-245

6) Remove the four screws ⑧, and remove the main drive assembly ⑨.

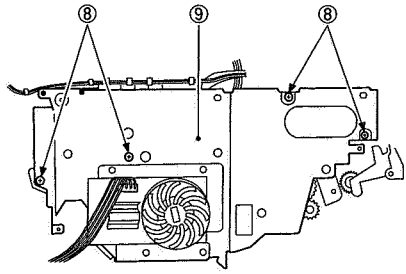

Figure 4-246

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III. PICK-UP/FEEDING SYSTEM

A. Pick-Up Assembly

1. Cassette Pick-Up Roller Unit

1) Remove the cassette.
2) Open the right door, and remove the two screws ①; then, remove the multifeeder unit ②.

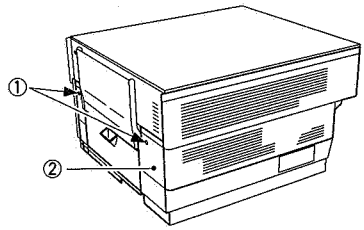

Figure 4-301

3) Remove the spacer ③.

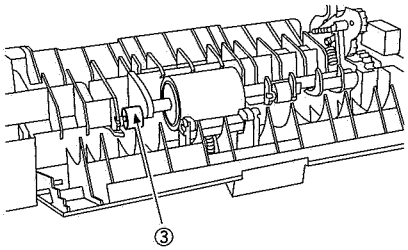

Figure 4-302

4) While pushing down the shaft retainer ④, move the cassette pick-up roller shaft ⑤ toward the front.

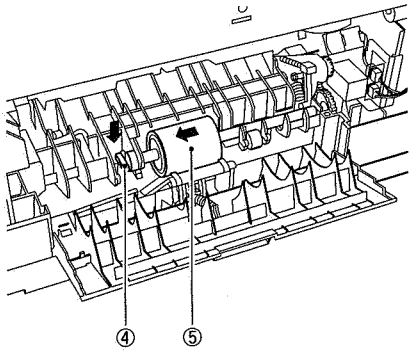

Figure 4-303

5) While removing the bushing ⑥, remove the cassette pick-up roller unit ⑦.

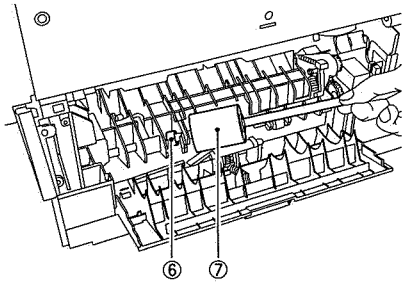

Figure 4-304

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Caution:

When installing the multifeeder unit, go through the following steps:

1) Turn on the power switch, and select multifeeder mode; then, press the Copy Start key.
2) When the pick-up gear unit has risen to its topmost position, turn off the power switch.

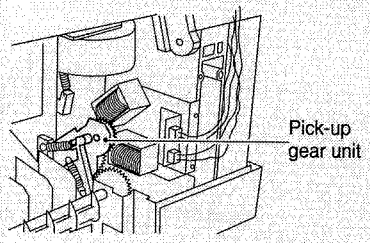

Figure 4-305

3) After installing the multifeeder unit, select multifeeder mode and make one copy.

2. Removing the Pick-Up Roller

1) Remove the pick-up roller unit. (See "1. Removing Pick-Up Roller Unit.")
2) Remove the stop ring (plastic) ①, and pull out the pick-up roller.

Caution:

Take care not to lose the pin at the rear.

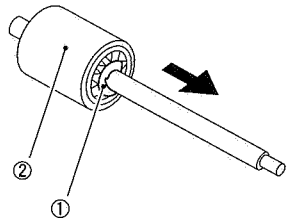

Figure 4-306

3. Removing the Pick-Up Clutch (PC720/740)

1) Remove the top cover. (See "Removing the Top Cover.")
2) Open the copier's top unit, and fix it in position using the grip of the screwdriver (about 30 mm dia.).

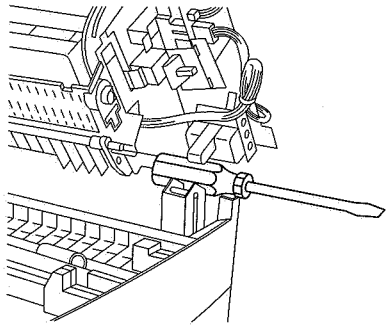

Figure 4-307

3) Remove the spring ①.

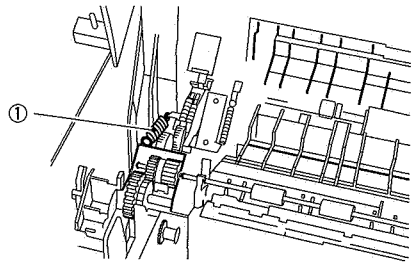

Figure 4-308

4) Remove the spring ③; then, while extending the bushing ④, remove the lower registration roller unit.

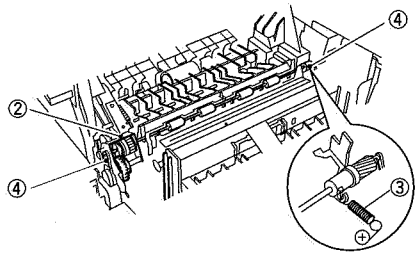

Figure 4-309

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5) Disconnect the connector ⑤, and remove the screw ⑥; then, remove the solenoid unit ⑦.

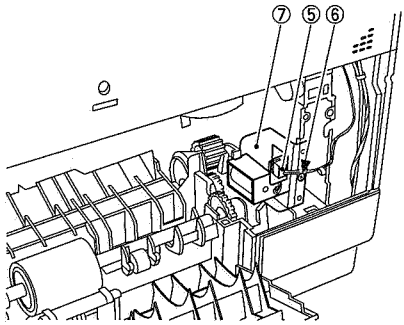

Figure 4-310

6) Remove the screw ⑧, and remove the bushing ⑨; then, remove the gear unit ⑩ and the pick-up clutch unit ⑪.

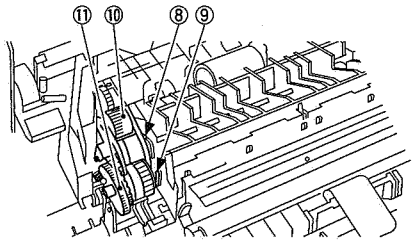

Figure 4-311

7) Free the clutch unit ⑪ from the claw ⑫ of the gear unit ⑩.

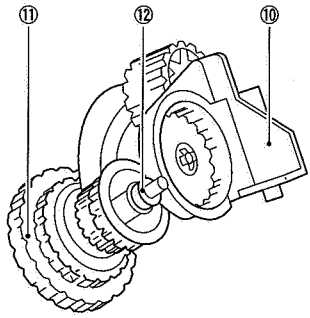

Figure 4-312

8) Remove the two E-rings ⑬ and washer ⑭; then, pull out the pick-up clutch ⑮.

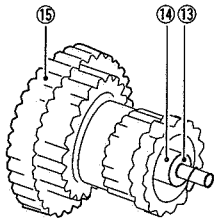

Figure 4-313

4. Removing the Pick-Up Clutch (PC750/770)

1) Remove the top cover. (See "Removing the Top Cover.")
2) Remove the front lower cover. (See "Removing the Front Lower Cover.")
3) Open the copier's top unit, and remove the spring ①.

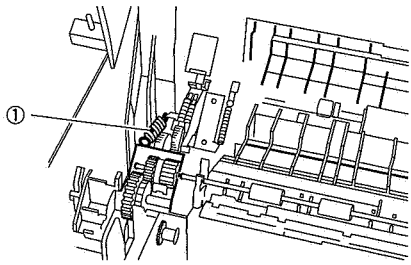

Figure 4-314

4) Remove the spring ③; then, while extending the bushing ④, remove the lower registration roller unit ②.

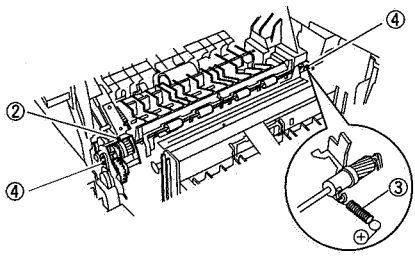

Figure 4-315

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5) Disconnect the two connectors ⑤, and remove the screw ⑥; then, remove the solenoid ⑦.

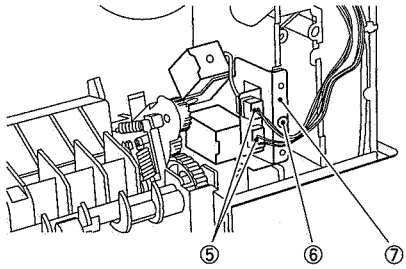

Figure 4-316

6) While extending the bushing ⑧, remove the pick-up clutch unit ⑨.

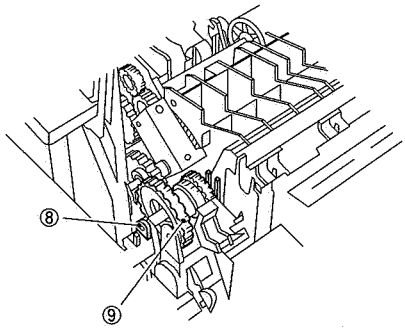

Figure 4-317

7) Remove the E-ring ⑩ and the washer ⑪; then, pull out the pick-up clutch ⑫.

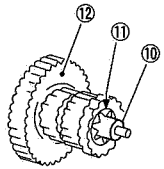

Figure 4-318

B. Multifeeder Assembly

1. Removing the Multifeeder Assembly

1) open the right door.
2) Remove the two screws ①, and remove the multifeeder assembly ②.

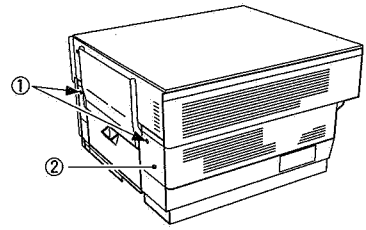

Figure 4-319

2. Removing the Multifeeder Pick-Up Roller

1) Remove the multifeeder assembly. (See "1. Removing the Multifeeder Assembly.")
2) Remove the bushing ① and the gear ② while disengaging the claw ③.

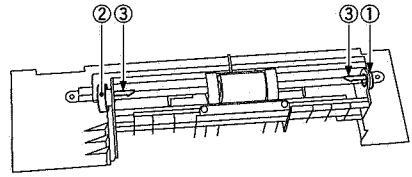

Figure 4-320

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3) Remove the multifeeder pick-up roller unit ④.

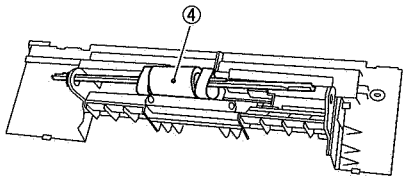

Figure 4-321

4) While disengaging the claw ⑤, pull out the multifeeder pick-up roller.

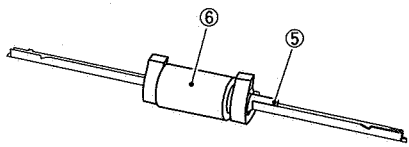

Figure 4-322

3. Removing the Separation Pad

1) Remove the multifeeder pick-up roller shaft. (See "1. Removing the Multifeeder Roller.")
2) Remove the pick-up tray.
3) Remove the stopper ① by disengaging the claw ②.

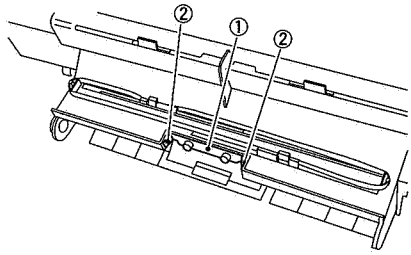

Figure 4-323

4) Push up the holding plate ③; then, move it toward the rear to remove.

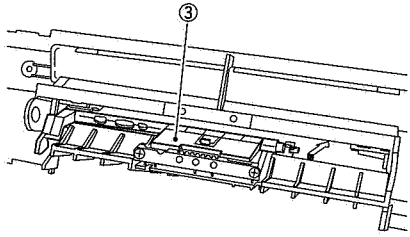

Figure 4-324

5) Push up the separation pad ④; then, pull it out while pushing the shaft ⑤ toward the inside.

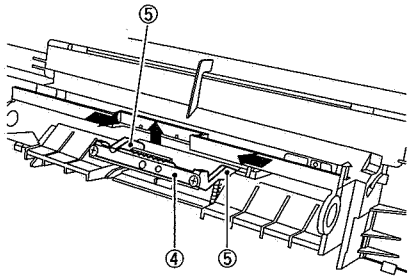

Figure 4-325

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C. Singlefeeder Assembly

1. Removing the Singlefeeder Assembly

1) Open the right door.
2) Remove the two screws ①, and remove the singlefeeder assembly ②.

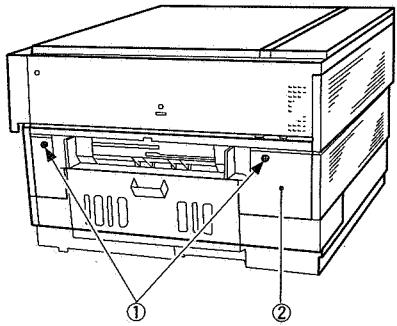

Figure 4-326

2. Removing the Singlefeeder Pick-Up Roller

1) Remove the singlefeeder assembly. (See "1. Removing the Singlefeeder.")
2) Push up the stopper lever ①, and move the singlefeeder pick-up roller ② in the direction of the arrow.

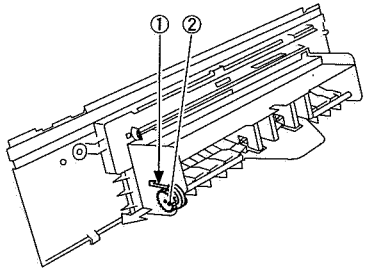

Figure 4-327

3) Move the singlefeeder pick-up roller ② in the direction of the arrow; then, remove it together with the paper guide plate ③.

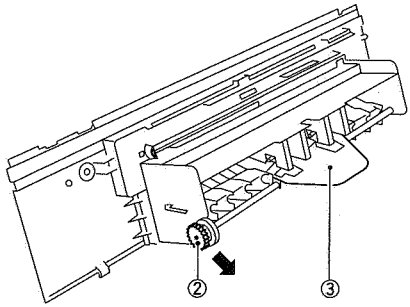

Figure 4-328

4) Disengage the claw ④ of the paper guide plate ③, and remove the singlefeeder pick-up roller ②.

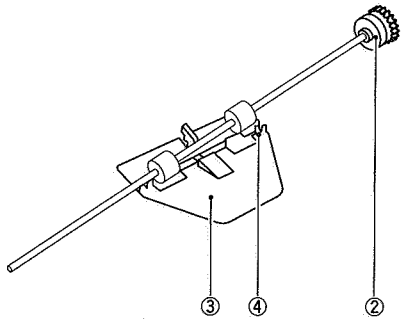

Figure 4-329

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D. Feeding Assembly

1. Detaching the Feeding Belt

1) Open the copier's top unit.
2) Push down the stopper ①, and remove the gear ②.

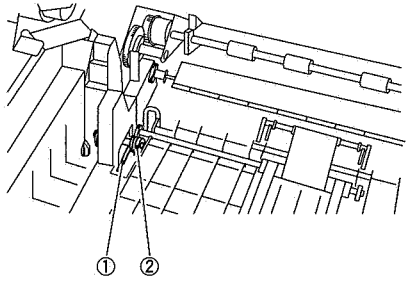

Figure 4-330

3) Remove the bushing ③, and remove each roller ④ and detach the feeding belt ⑤.

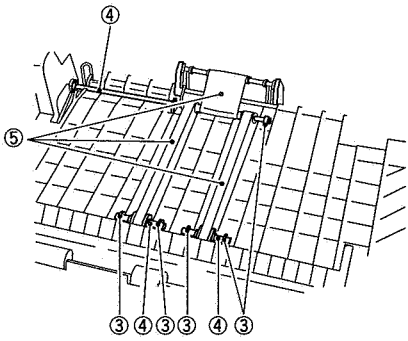

Figure 4-331

E. Registration Roller (lower)

1. Removing the Registration Roller Unit

1) Open the copier's top body.
2) Remove the spring ①.

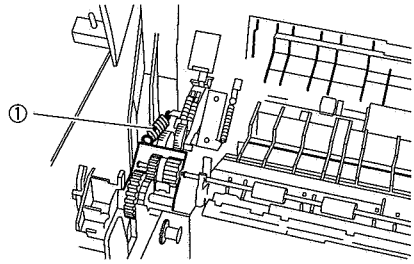

Figure 4-332

3) Remove the spring ③; then, remove the lower registration roller unit ② while extending the bushing ④.

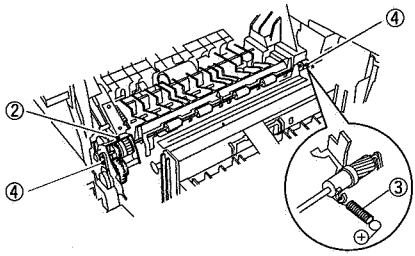

Figure 4-333

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2. Removing the Registration Roller Clutch

1) Remove the registration roller unit. (See "1. Removing the Registration Roller Unit.")
2) Remove the two E-rings ①.

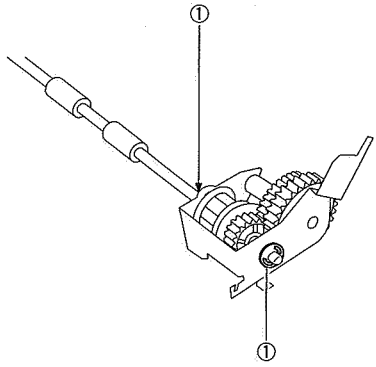

Figure 4-334

3) Remove the two bushes ②.

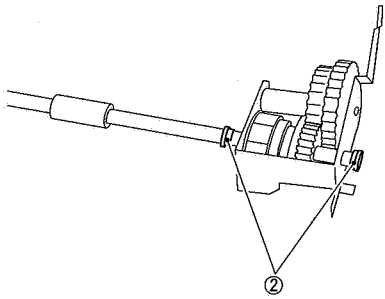

Figure 4-335

4) While moving down the registration roller ③, detach it from the gear unit ④.

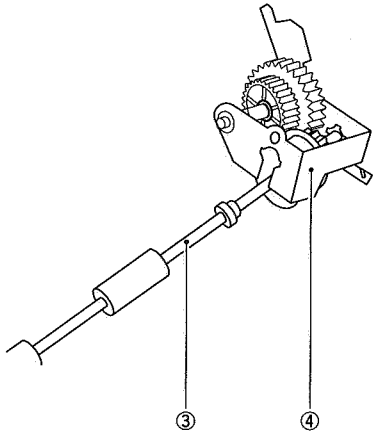

Figure 4-336

5) Remove the E-ring ⑤, and pull out the clutch ⑥.

Caution:
Take care not to lose the pin from the rear of the clutch.

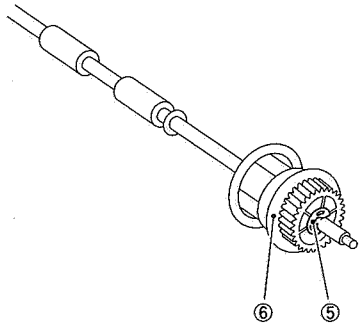

Figure 4-337

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E. Delivery Assembly

1. Removing the Delivery Roller

1) Open the copier's top unit.
2) Remove the screw ①, and remove the noise filter PCB cover ②.

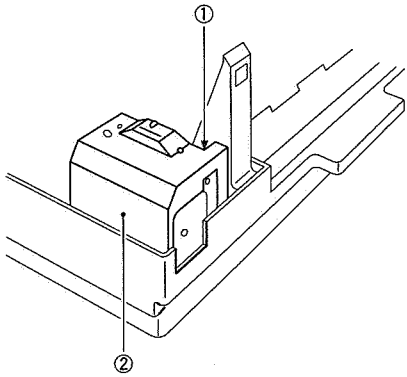

Figure 4-338

3) Push the claws ③, and shift the delivery roller gear unit ④.

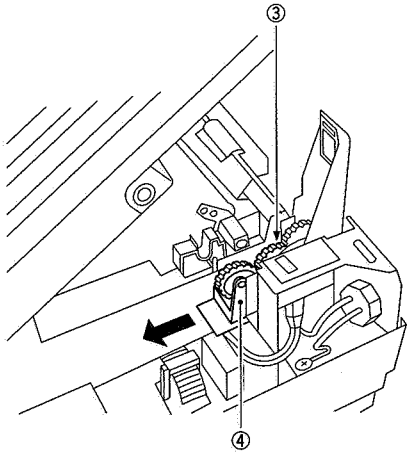

Figure 4-339

4) Remove the delivery roller ⑤.

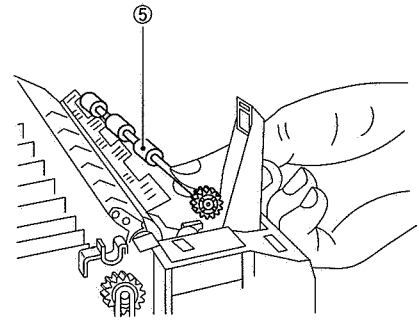

Figure 4-340

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IV. EXPOSURE SYSTEM

A. Illuminating Assembly

1. Removing the Scanning Lamp

1) Disconnect the power plug.
2) Remove the top cover.
3) Remove the copyboard glass.
4) Hook fingers on both ends of the scanning lamp ①, and remove the lamp while rotating it.

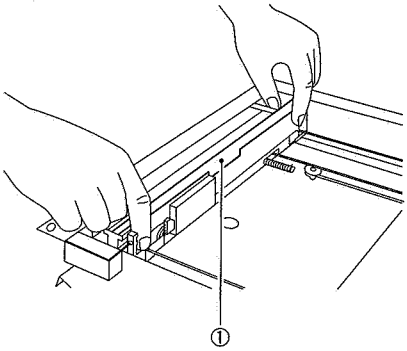

Figure 4-401

2. Installing the Scanning Lamp

Install the scanning lamp so that the light-emitting portion (transparent glass) is on the left when viewed from the front of the copier.

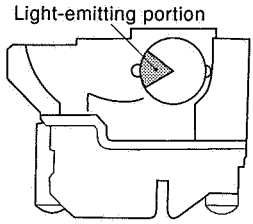

Figure 4-402 (front view)

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3. Removing the Blanking Unit

1) Select enlargement mode (141%).
   - Turn on the power switch, and select 141%.
   - Press the Copy Start key.
   - When the lens has moved farthest left, turn off the power.
     Turn off the power, and disconnect the power plug.
2) Remove the multifeeder assembly.
3) Remove the cartridge.
4) Remove the top cover.
5) Remove the DC controller PCB.
6) Remove the two screws ② from the rear of the composite power supply PCB ①.

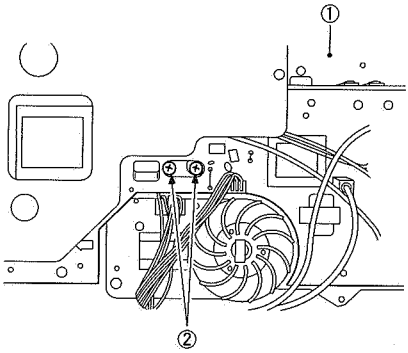

Figure 4-403

7) Open the copier's top unit, and remove the four screws ③; then, remove the blanking unit ④.

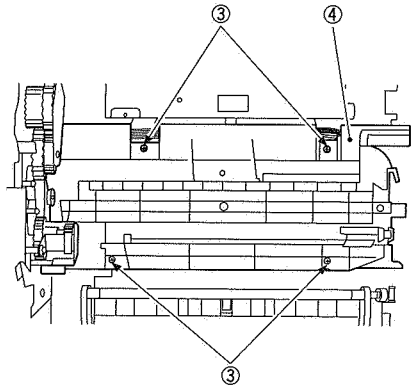

Figure 4-404

Caution:

When installing the blanking unit, make sure that the blanking unit PCB is farthest to both ends and the copier's lens is at the farthest left.

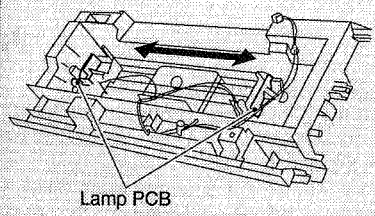

Figure 4-405

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V. CHARGING/DEVELOPING/CLEANING SYSTEM

A. Cartridge

1. Outline

The copier's photosensitive drum, primary charging roller, developing assembly, and cleaner are housed in a single container called cartridge. (You cannot disassemble the cartridge.)

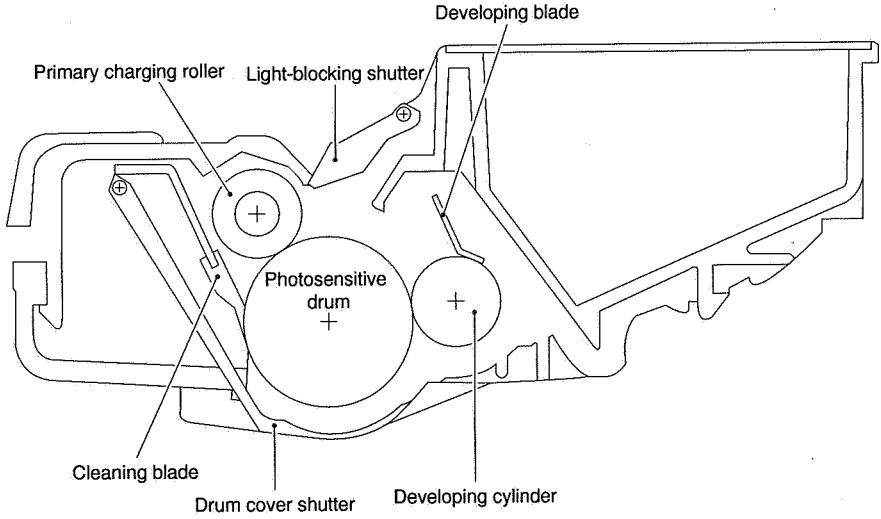

Figure 4-501

a. Drum Cover Shutter

If the photosensitive drum is exposed to strong light for a long period of time, the copies can come to show white spots or black bands; the drum cover shutter is provided to prevent such a problem.

You should not open the drum cover shutter without good reason; it is designed to open when the cartridge is inserted into the copier and the copier's top unit is closed.

b. Light-Blocking Shutter

Light enters through the image exposure opening when the cartridge is removed from the copier; the light-blocking shutter is provided to protect the photosensitive drum from such light.

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2. Cleaning the Drum

Caution:
As a rule, do not clean or touch the photosensitive drum.

1) Open the copier's top body, and remove the cartridge.
2) Put the cartridge upside down, and open the drum shutter.
3) Clean the surface of the drum using a cloth coated with toner.

Caution:
1. The drum must always be rotated in the direction it rotates when making copies. Rotating it in the opposite direction will displace the leaf spring used to apply a developing bias to the developing cylinder.
2. Do not use paper, lint-free or others, to avoid damage to the drum; use a flannel cloth.
3. Work quickly to limit the exposure of the drum to light.

Reference:
If the drum is exposed to light of 1500 lux (general lighting) for 5 min and left alone thereafter in a dark place for 5 min, it is likely to recover to a level that will not cause any practical problems; however, take all measures necessary to avoid exposure. (The direct rays of the sun, in passing, is as strong as 10,000 to 30,000 lux.)

B. Transfer corona Assembly

1. Removing the Transfer Charging Roller

1) Open the copier's top unit.
2) Remove the screw ①.

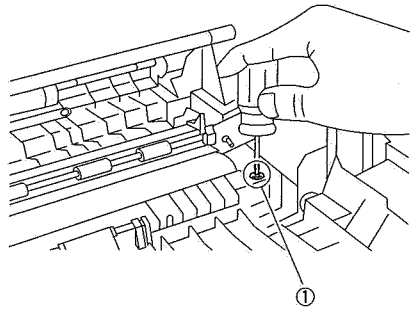

Figure 4-502

3) While disengaging the claw ② of the bushing, remove the transfer charging roller ③.

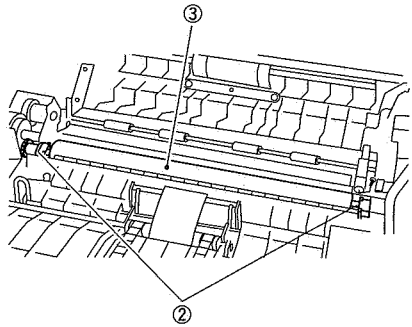

Figure 4-503

Caution:
Do not touch the roller surface; take care not to soil the roller surface.

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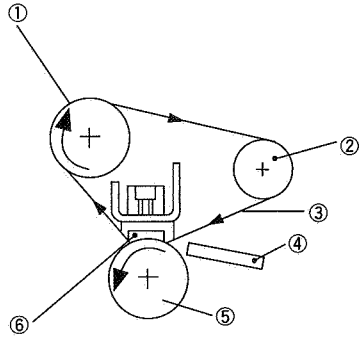
VI. FIXING SYSTEM

1. Construction



① Drive roller
② Tension roller
③ Fixing film
④ Inlet guide
⑤ Lower fixing roller
⑥ Fixing heater

Figure 4-601

Caution:
The fixing film is made of special material; do not touch it or soil it.
The upper fixing unit is to be replaced on a unit basis.

2. Removing the Upper Fixing Unit

1) Open the copier's top unit.
2) Remove the two screws ①, and remove the front upper cover ②.

Caution:
The flexible cable for the control panel is connected to the front upper cover; disconnect the cable from the DC controller PCB.

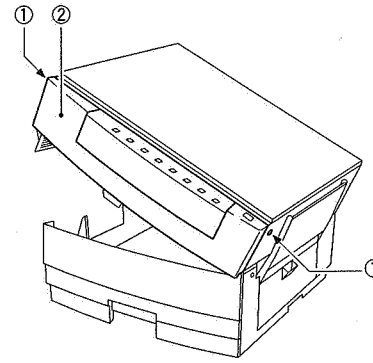


Figure 4-602

3) Disengage the two claws ③, and slide the left cover ④ down to remove.

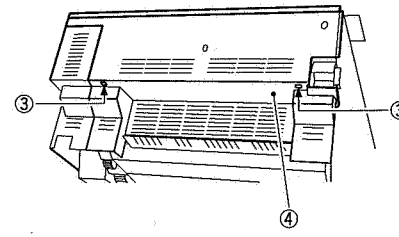


Figure 4-603

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4) Disconnect the connector ⑤.

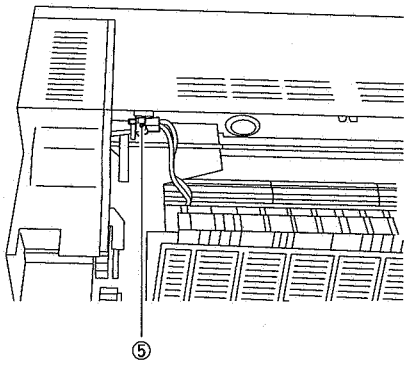

Figure 4-604

5) Disconnect the connectors J112 ⑦, J102 ⑧, and J117 ⑨ from the DC controller PCB ⑥.

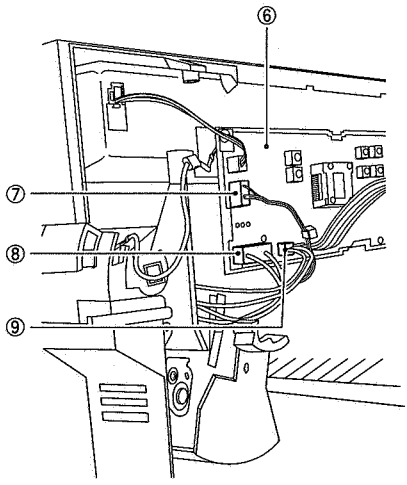

Figure 4-605

6) Remove the screw ⑩, and remove the upper fixing unit fixing plate ⑪.

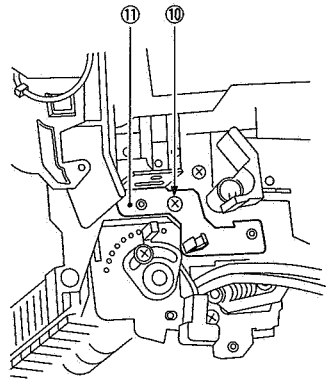

Figure 4-606

7) While avoiding the fixing assembly shutter ⑫, remove the upper fixing unit ⑬ while holding it with copy paper.

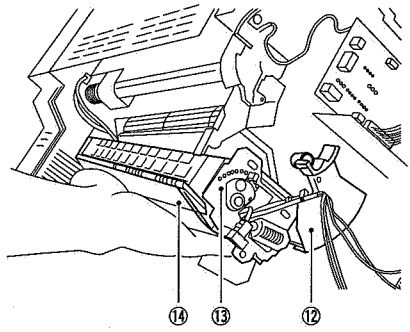

Figure 4-607

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2. Removing the Lower Fixing Roller

1) Open the copier's top unit.
2) Remove the delivery roller. (See "1. Removing the Delivery Roller" under "E. Delivery Assembly.")
3)

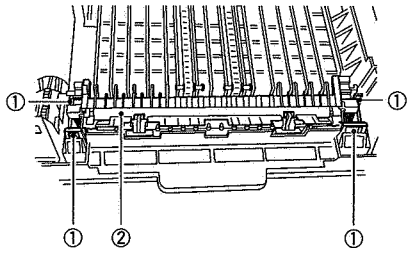

Figure 4-608

4) Remove the two springs ③ and two bushings ②, and remove the lower fixing roller ⑤ and the inlet guide ⑥.

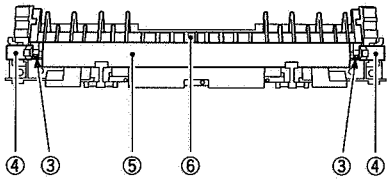

Figure 4-609

5) Remove the inlet guide retainer ⑦, and remove the inlet guide ⑥ from the lower fixing roller.

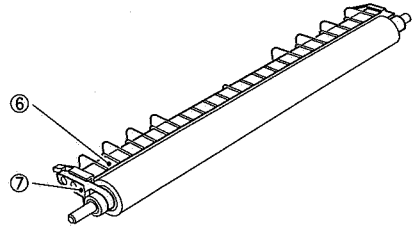

Figure 4-610

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VII. ELECTRICAL SYSTEM

A. DC Controller PCB

1. Removing the DC Controller PCB

1) Open the copier's top unit.
2) Remove the two screws ①, and remove the front upper cover.

Caution:

The flexible cable for the control panel is connected to the upper front cover; disconnect the cable from the DC controller PCB.

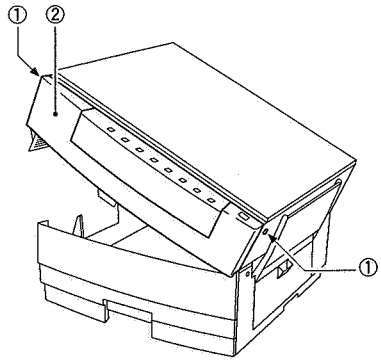

Figure 4-701

3) Disconnect all connectors from the DC controller PCB ③; then, remove the screw ④ and free the six claws ⑤ to remove the DC controller PCB ③.

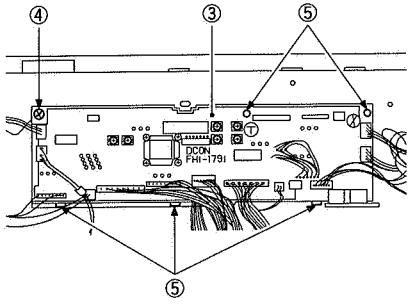

Figure 4-702

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B. Composite Power Supply PCB

1. Removing the Composite Power Supply PCB

1) Open the copier's top unit.
2) Remove the left cover and the rear cover.
3) Remove the screw ①, and remove the copyboard cover support retainer ②.

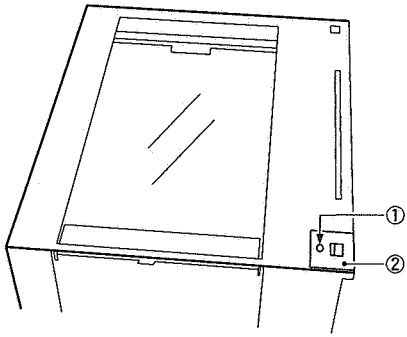

Figure 4-703

4) Disconnect the ten connectors ④ from the composite power supply PCB ③.

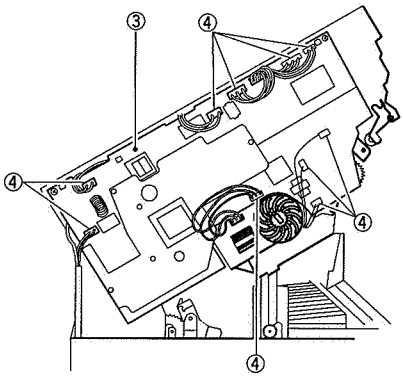

Figure 4-704

5) Remove the seven screws ⑤, and remove the composite power supply PCB ③ while freeing the five claws ⑥.

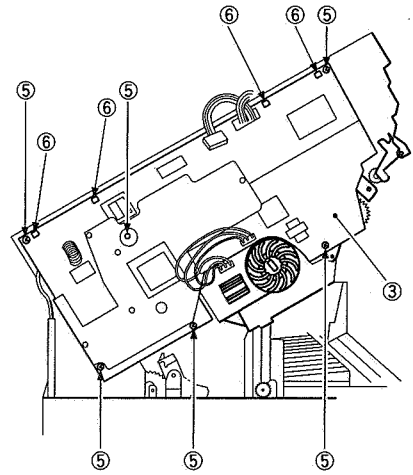

Figure 4-705

2. Points to Note When Handling the Composite Power Supply PCB

Some capacitors on the composite power supply hold charges when the copier's power supply is off.

Take extra care never to short the terminals of the capacitor whenever you have removed the composite power supply PCB.

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CHAPTER 5
INSTALLATION

I. SELECTING THE SITE 5-1
II. UNPACKING AND INSTALLATION..... 5-2
III. RELOCATING THE COPIER 5-7

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I. SELECTING THE SITE

Make sure that the site satisfies the following requirements; pay a visit to the user's before the delivery of the machine:

- The site should have an exclusive power outlet that can provide the rated voltage ±10% (15A or more).
- The site's temperature must be 7.5° to 32.5°C and humidity, 5% to 85%. Avoid areas near water faucets, water boilers, humidifiers, and refrigerators.
- Avoid areas near sources of fire or areas subject to ammonium gas and direct rays of the sun. (As necessary, provide curtains.)
- The site must be well ventilated. The amount of ozone generated by the copier while in use will not affect the health of the individuals around it. Some, however, may find the odor unpleasant, and it is important to keep the site well ventilated.
- The site should be able to keep the copier level, with its feet firmly in contact.
- The site must allow at least 10 cm of space from all walls enough for the operation of the machine.

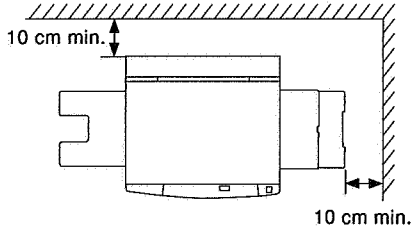

Figure 5-101

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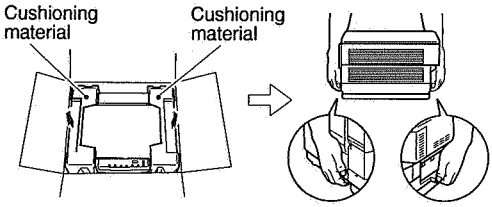
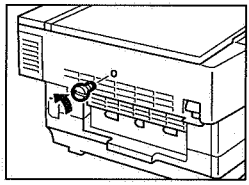
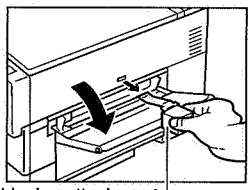
II. UNPACKING AND INSTALLATION

When a piece of metal is brought in from a cold to warm place, droplets of water tend to form on its surface. The phenomenon is called *condensation*, and a copier subjected to condensation often produces blank copies. If you are installing a copier brought in from a cold place, leave it alone unpacked for one hour or more until it becomes acclimatized to the room.

A. Unpacking and Installing

Step	Work	Checks/remarks
1	Take out the copier and accessories, and make sure none of the accessories is missing.	To take out the copier, remove the cushioning materials from its left/right and top, and hold it by hooking hands under its grips.  Accessories ① Cassette ② Copy tray ③ Power cord ④ User's Manual ⑤ Copying Guide ⑥ Warranty card
2	Remove the screw from the copier's left side.	
3	Detach the tapf to remove the shipping attachment on the right side of the copier.	

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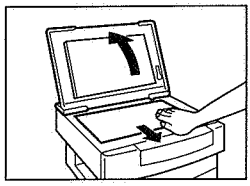
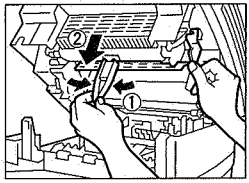
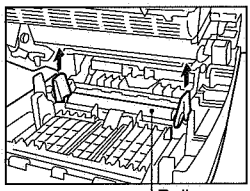
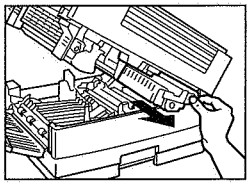
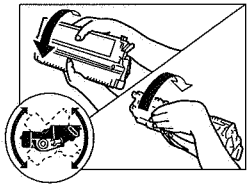
Step	Work	Checks/remarks
4	Remove the protection sheet from the copyboard glass.	
5	Open the copier, and remove the attachment from its top unit.	
6	Pull the two cardboard pieces, located inside the copier at either end of the roller, straight up and out of the copier. *Note: Do not touch the roller inside the copier.*	
7	Pick the tab on the cartridge, and pull out the cartridge from the copier.	
8	Hold the cartridge level, with the warning label facing up; and rotate it about 90° in both directions several times.	

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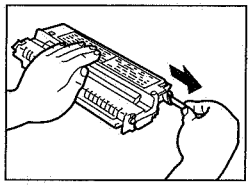
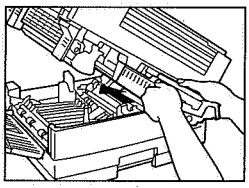
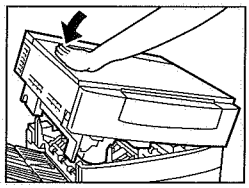
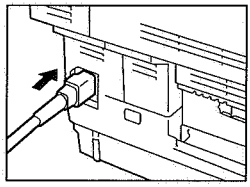
Step	Work	Checks/remarks
9	Place the cartridge on a level surface, and peel the tip of the opening seal, and pull it fully out (about 50 cm).	
10	Hold the cartridge with the warning label facing up, and insert the cartridge with care until it stops.	
11	Push the icon on the copier's top unit to close.	
12	Connect the power cord to the power cord connector.	
13	Connect the power plug to the power outlet, and turn on the power switch.	• Make sure that the AE and DIRECT indicators turn on, the copy count/ratio indicator indicates 'P', and the Add Paper message flashes. • Press the Copy Count/Zoom Set key and Clear/Stop key to make sure that the correct copy count is indicated. • Press the Default Ratio key to make sure that the ratio mode changes. • Press the Zoom key to make sure that '%' is indicated, and press the Copy Count/Zoom key to make sure that the correct ratio is indicated.

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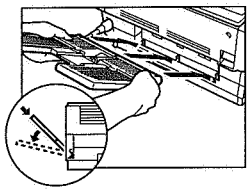
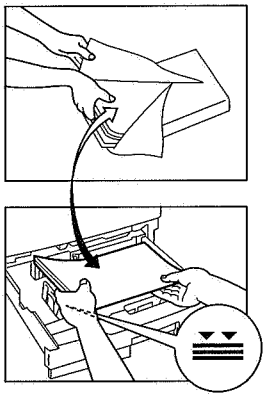
Step	Work	Checks/remarks
14	Attach the copy tray.	• Make sure that the copier's ribs are all in the three grooves of the copy tray. 
15	Remove the materials from inside the cassette, and adjust the paper width and length guides inside the cassette to suit the size of copy paper; then, set copy paper. • For more details, see p. 5-6.	• The copy paper has its face and back; be sure to place it correctly inside the cassette butting it against the right side of the cassette. • Make sure that the stack of copy paper is not above the height index on the inner side of the paper width guide. 
16	Set the Test Sheet on the copyboard, and check copying operation.	• Make sure there is no abnormal noise. • Make sure that as many copies as specified are made normally.
17	Clean the copier's exterior and the area around it.	

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B. Setting Copy Paper

Adjust the paper width and length guides inside the cassette to suit the size of copy paper.

1) Slide out the cassette from the copier.
2) Move the paper length guide inside the cassette to suit the length of the copy paper to be used.

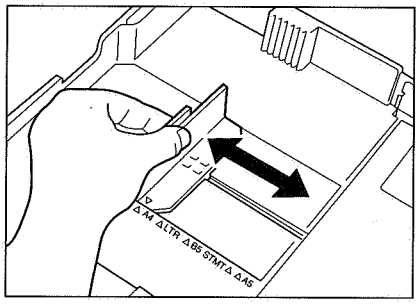

Figure 5-201

3) Move the paper width guide inside the cassette to suit the width of the copy paper to be used.

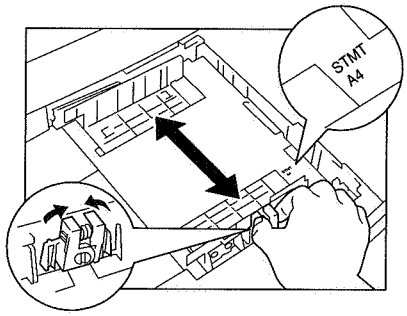

Figure 5-202

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III. RELOCATING THE COPIER

Go through the following steps if you must relocate the copier by truck or other means of transportation:

Step	Work	Checks/remarks
1	Turn on the power switch, and make sure that DIRECT mode is selected.	
2	Turn off the power switch, and disconnect the power plug from the power outlet.	
3	Detach the copy tray.	
4	Remove the cassette.	
5	Remove the cartridge.	Keep the cartridge in a protective box, and make sure it will not be subjected to vibration while in transit.
6	Tape the copier's top in place so that it will not open while in transit.	
7	Place an A4 sheet of copy paper on the copyboard glass, and close the copyboard cover, and tape it in place.	

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CHAPTER 6

MAINTENANCE AND SERVICING

I. PERIODICALLY REPLACED PARTS 6-1
II. DURABLES AND CONSUMABLES 6-1
III. SCHEDULED SERVICING 6-1
IV. POINTS TO NOTE WHEN HANDLING/STORING THE CARTRIDGE 6-2

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I. PERIODICALLY REPLACED PARTS

The copier does not have a part to be replaced on a periodical basis.

II. DURABLES AND CONSUMABLES

The copier does not have a part classified as a durable or consumable part.

III. SCHEDULED SERVICING

The copier has no part that must be serviced on a periodical basis.

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IV. POINTS TO NOTE WHEN HANDLING/ STORING THE CARTRIDGE

The cartridge is subject to the effects of the environment regardless of whether it has been opened or installed in the copier, and its properties change over time. The degree of change is dependent on the site/storage environment, and it is very important to take care when handling or storing it.

A. Storing Without Removing the Seal

When storing the cartridge at the workshop or the like, make sure that the conditions in Table 6-401 are respected with attention to the following:

- avoid areas subjected to the direct rays of the sun.
- avoid areas subject to vibration.
- take care not to subject it to shocks or drop it.

Temperature	Normal (9/10 of period)		0° to 35°C/ 32° to 95°F
	Severe (1/10 of period)	High	35° to 40°C/ 95° to 104°F
		Low	-20° to 0°C/ -4° to 32°F
Temperature fluctuations (within about 3 min)			40° → 15°C/ 104° → 59°F -20°C → 25°C/ -4°F → 77°F
Humidity	Normal (9/10 of period)		35 to 85%RH
	Severe (1/10 of period)	High	85 to 95%RH
		Low	10 to 35%RH
Atmospheric pressure			460 to 760 mmHg (0.1 to 1 atm)

Table 6-401 Temperature/Humidity Conditions (storage)

Temperature	Humidity
-20° to 40°C/-4° to 104°F	90% or less

Table 6-402 Conditions (transportation)

B. After Opening

The photosensitive medium is organic photoconductor (OPC), and deteriorates when exposed to strong light. The cartridge also contains toner, and it is important to advise the user to handle it with care to avoid soiling. Make sure that the cartridge is placed in a protective box for storage.

1. Storing after Removing the Seal

a. Avoid areas subjected to the direct rays of the sun—windows or bright places. Do not keep it inside a car for a long period of time.
The cartridge should never be placed under the sun or inside a car for a long time regardless of whether it is kept in a box.
b. Avoid areas where the temperature/ humidity is too high or too low or where such environmental factors change rapidly; e.g., near refrigerators.
c. Avoid areas subject to dust, ammonium gas, or organic solvent gas.
d. Keep the cartridge at 40°C or less.

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2. Handling

a. Before setting the cartridge to the copier or if white spots appear on the copies as toner runs out, hold the cartridge level as shown in Figure 6-401 and rotate it about 90° in both directions several times to even out the toner inside it. Do not shake the cartridge in ways not instructed, or toner may leak from the developing assembly or the cleaning assembly.

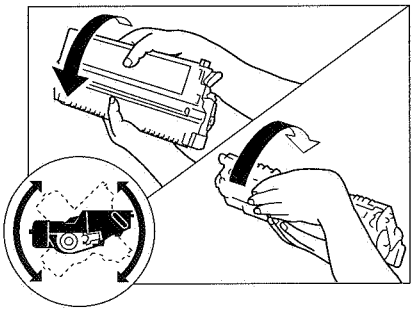

Figure 6-401

b. Do not stand the cartridge on its end or upside down. Do not swing it.

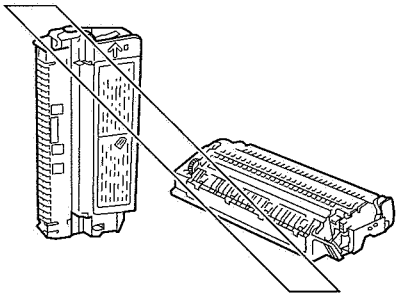

Figure 6-402

c. Do not open the shutter for the photosensitive drum cover under the cartridge to touch the photosensitive drum.
If you soiled the surface of the photosensitive drum by mistake, clean it with a flannel cloth coated with toner. Do not dry wipe it or use solvent.

d. Do not disassemble the cartridge.

e. Do not subject the cartridge to vibration or shocks. In particular, do not press down on the photosensitive drum through the shutter for the photosensitive drum cover.

f. Keep the cartridge outside of reach of children.

g. The photosensitive drum is susceptible to light, and the cartridge is equipped with a light-blocking shutter. Nevertheless, exposure to strong light for a long period of time can still lead to white spots or black bands*. Keep the following in mind:
*Caused by residual memory on the drum; may disappear when the cartridge is left alone for some time.

Caution:

1. Work quickly when removing jams or replacing the cartridge.
2. If you are removing the cartridge for storage or for a color cartridge, be sure to place the removed cartridge in its protective box or cover it. Do not ever leave it unprotected.

Reference:

If the drum is exposed to light of 1500 lux (general lighting) for 5 min and left alone thereafter in a dark place for 5 min, it is likely to recover to a level that will not cause any practical problems; however, take all measures necessary to avoid exposure. (The direct rays of the sun, in passing, is as strong as 10,000 to 30,000 lux.)

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APPENDIX

A. GENERAL TIMING CHART A-1
B. SIGNALS AND ABBREVIATIONS A-2
C. GENERAL CIRCUIT DIAGRAM .. A-3
D. DC CONTROLLER CIRCUIT DIAGRAM A-5
E. COMPOSITE POWER SUPPLY CIRCUIT DIAGRAM A-13
F. CONTROL PANEL CIRCUIT DIAGRAM A-21
G. INTENSITY/AE SENSOR CIRCUIT DIAGRAM A-23
H. SENSOR CIRCUIT DIAGRAM A-24
I. NOISE FILTER CIRCUIT DIAGRAM A-25
J. HIGH-VOLTAGE CONTACT CIRCUIT DIAGRAM A-26
K. BLANK EXPOSURE (front) CIRCUIT DIAGRAM A-27
L. BLANK EXPOSURE (rear) CIRCUIT DIAGRAM A-28
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N. SOLVENTS/OILS A-30

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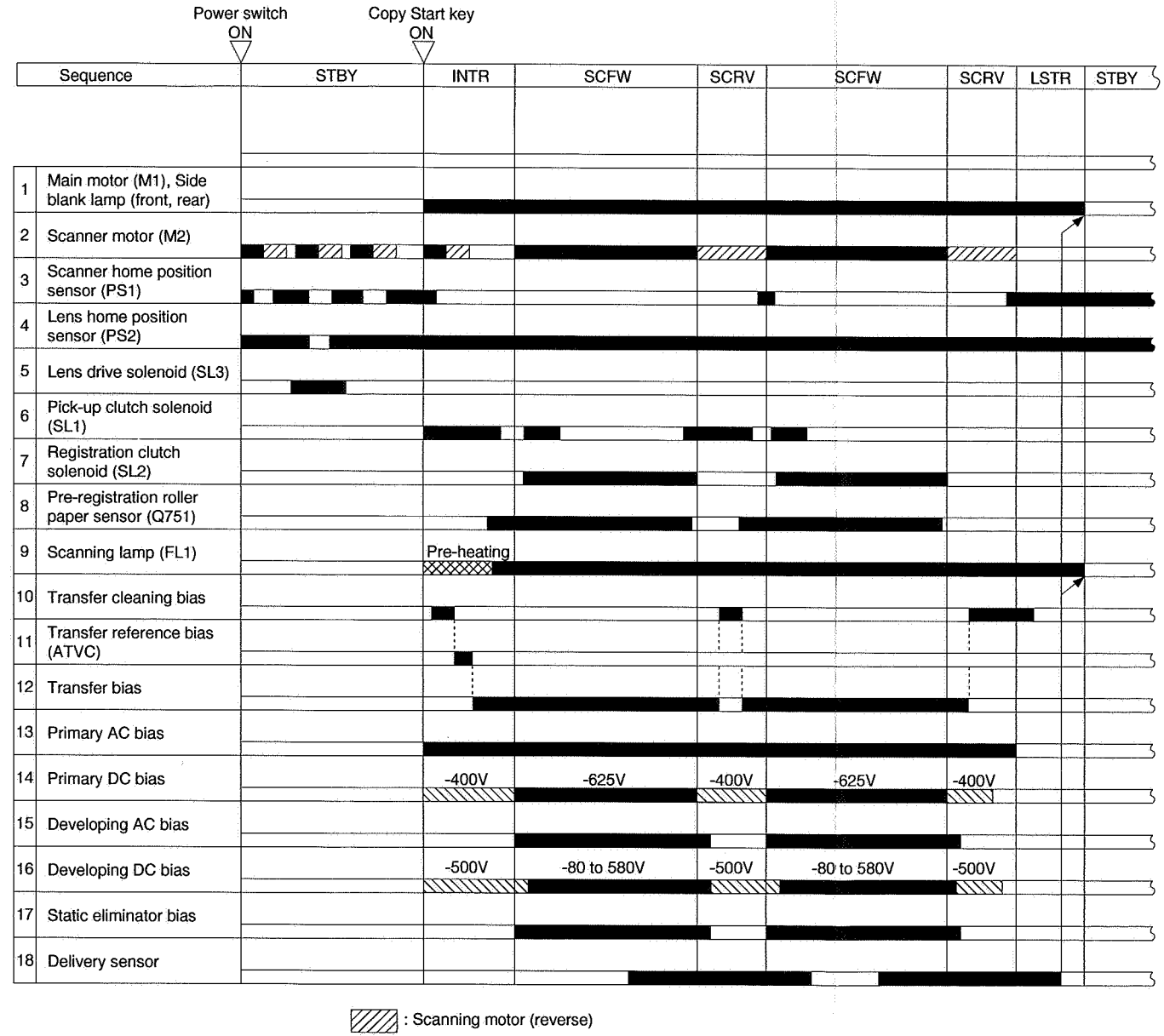
A. GENERAL TIMING CHART

(A4, 2 copies, DIRECT, from cassette)



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B. SIGNALS AND ABBREVIATIONS

1.Signals

ACBIAS	AC BIAS OSCILLATION signal
AE	AE SENSOR OUTPUT signal
AEREF	AE SENSOR REFERENCE signal
BIASS	DEVELOPING DC BIAS VOLTAGE DETECTION signal
CPD	CASSETTE PAPER DETECTION signal
DCBPWM	DC BIAS CONTROL signal
DPD	DELIVERY PAPER DETECTION signal
DVACON	DEVELOPING AC BIAS ON signal
DVDCON	DEVELOPING DC BIAS ON signal
FFD	FIXING FILM POSITION signal
FL ON	FLUORESCENT LAMP ON command
FLEXP	SCANNING LAMP INTENSITY signal
FLPRHT	PRE-HEAT VOLTAGE CONTROL signal
HTNG	FUSER HEATER NG signal
HTRD	HEATER DRIVE command
LHP	LENS HOME POSITION signal
LNSLD	LENS SOLENOID DRIVE command
MFSLD	MULTIFEEDER PICK-UP SOLENOID DRIVE command
MLOCK	MAIN MOTOR LOCK signal
MMCLK	MAIN MOTOR CLOCK signal
MMD	MAIN MOTOR DRIVE command
PACON	PRIMARY DC BIAS ON signal
PDCPWM	PRIMARY DC BIAS CONTROL signal
PUSLD	PICK-UP CLUTCH SOLENOID DRIVE command
RGSLD	REGISTRATION CLUTCH SOLENOID DRIVE command
RPD	REGISTRATION PAPER DETECTION signal
SBLP	SIDE BLANK EXPOSURE LAMP ON signal
SC-A	SCANNER MOTOR PULSE command A
SC-A*	SCANNER MOTOR PULSE command A*
SC-B	SCANNER MOTOR PULSE command B
SC-B*	SCANNER MOTOR PULSE command B*
SC-COMA	SCANNER MOTOR DRIVE command A
SC-COMB	SCANNER MOTOR DRIVE command B
SCHP	SCANNER HOME POSITION signal
SPD	SINGLEFEEDER PAPER DETECTION signal
TFDBCK	TRANSFER VOLTAGE MONITOR signal
TFWDRV	TRANSFER DC BIAS CONTROL signal
TFWON	TRANSFER DC BIAS ON signal
TFWS	TRANSFER CURRENT DETECTION signal
TH1	FIXING MAIN THERMISTOR signal
TH2	FIXING SUB THERMISTOR signal
TREVON	TRANSFER POSITIVE BIAS ON signal

2. Abbreviations

INTR	INITIAL ROTATION
LSTR	LAST ROTATION
CBFW	COPY BOARD FORWARD
CBRV	COPY BOARD REVERSE
STBY	STANDBY

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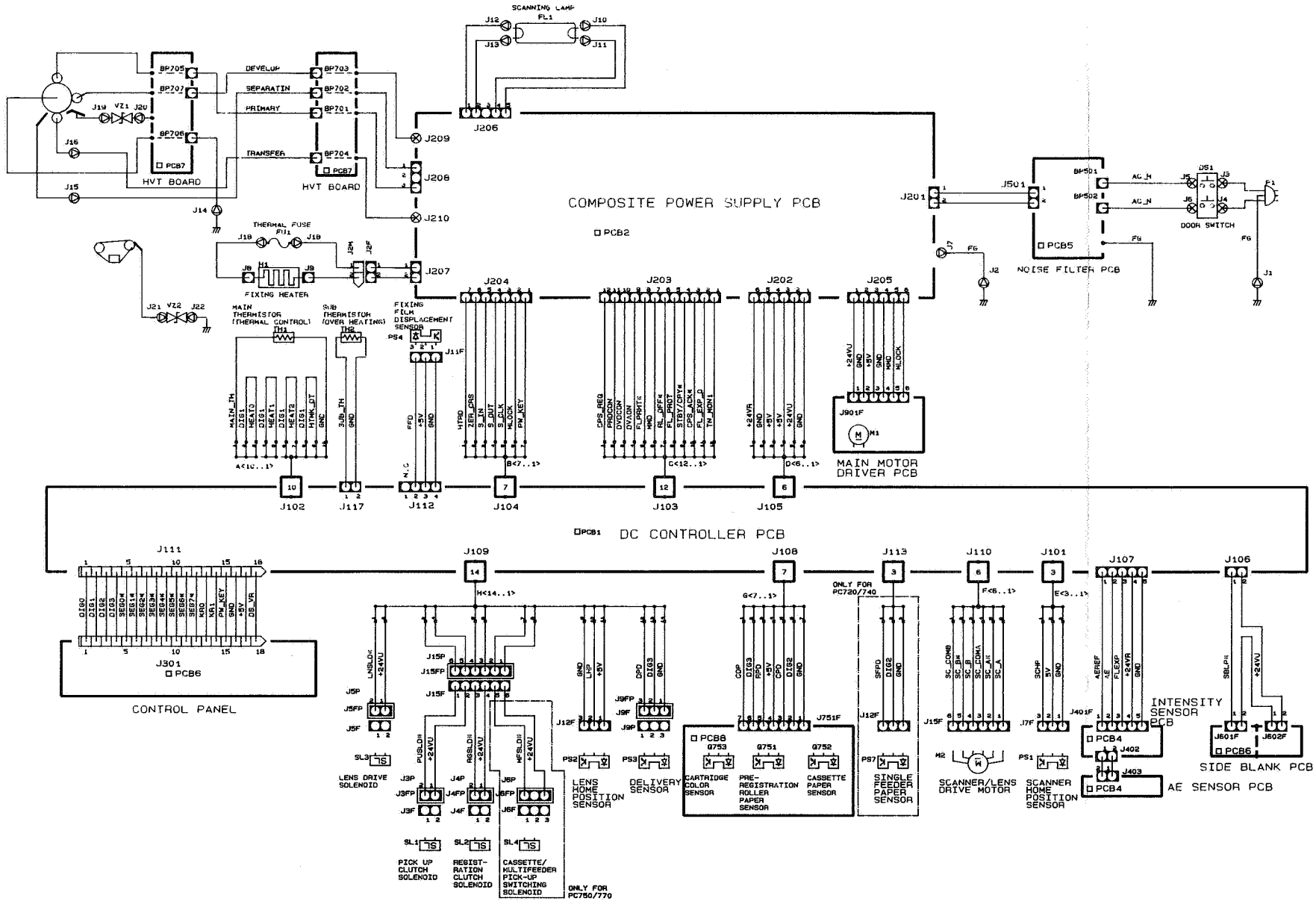

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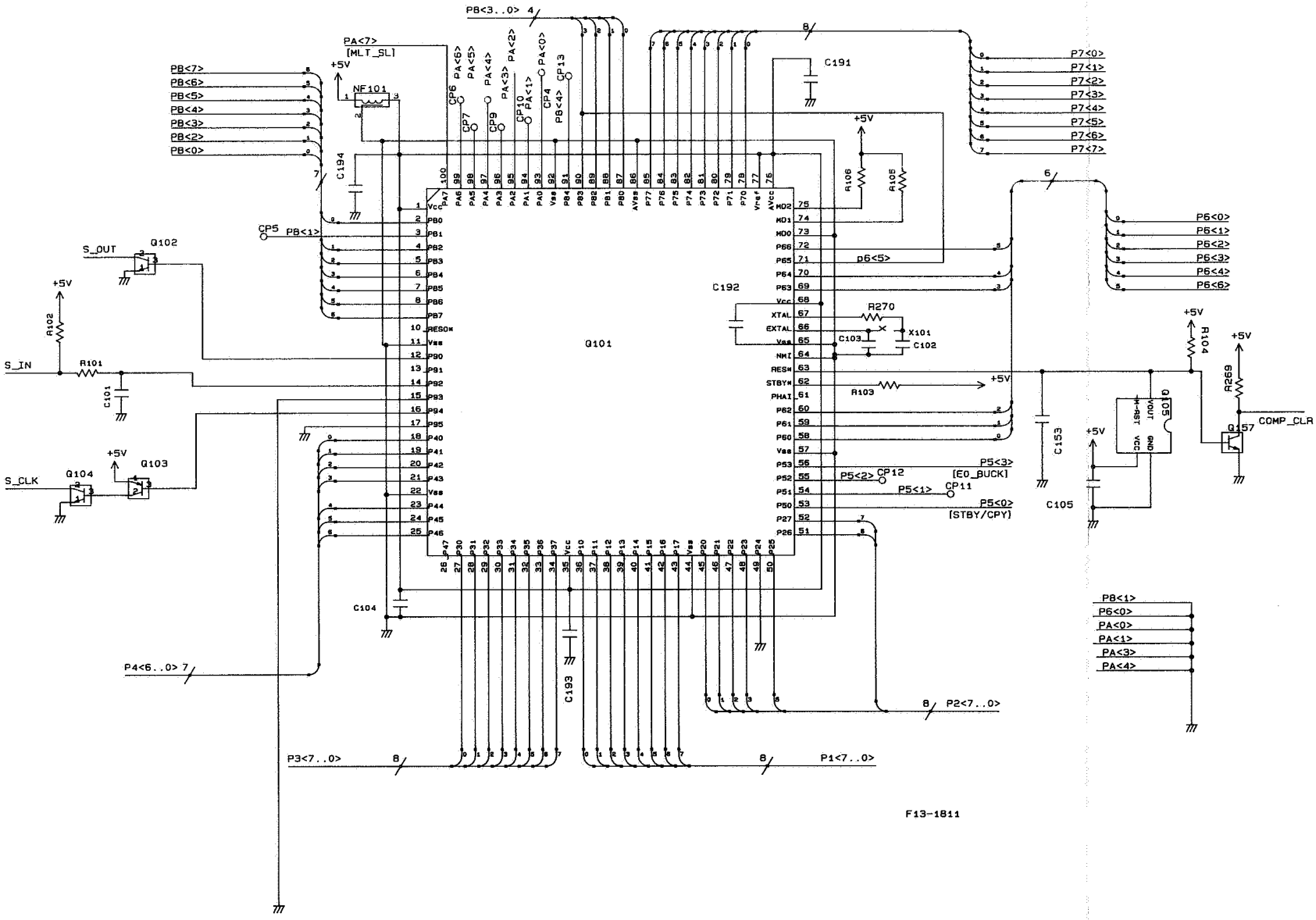
D. DC CONTROLLER CIRCUIT DIAGRAM

DC controller Circuit Diagram (1/8)



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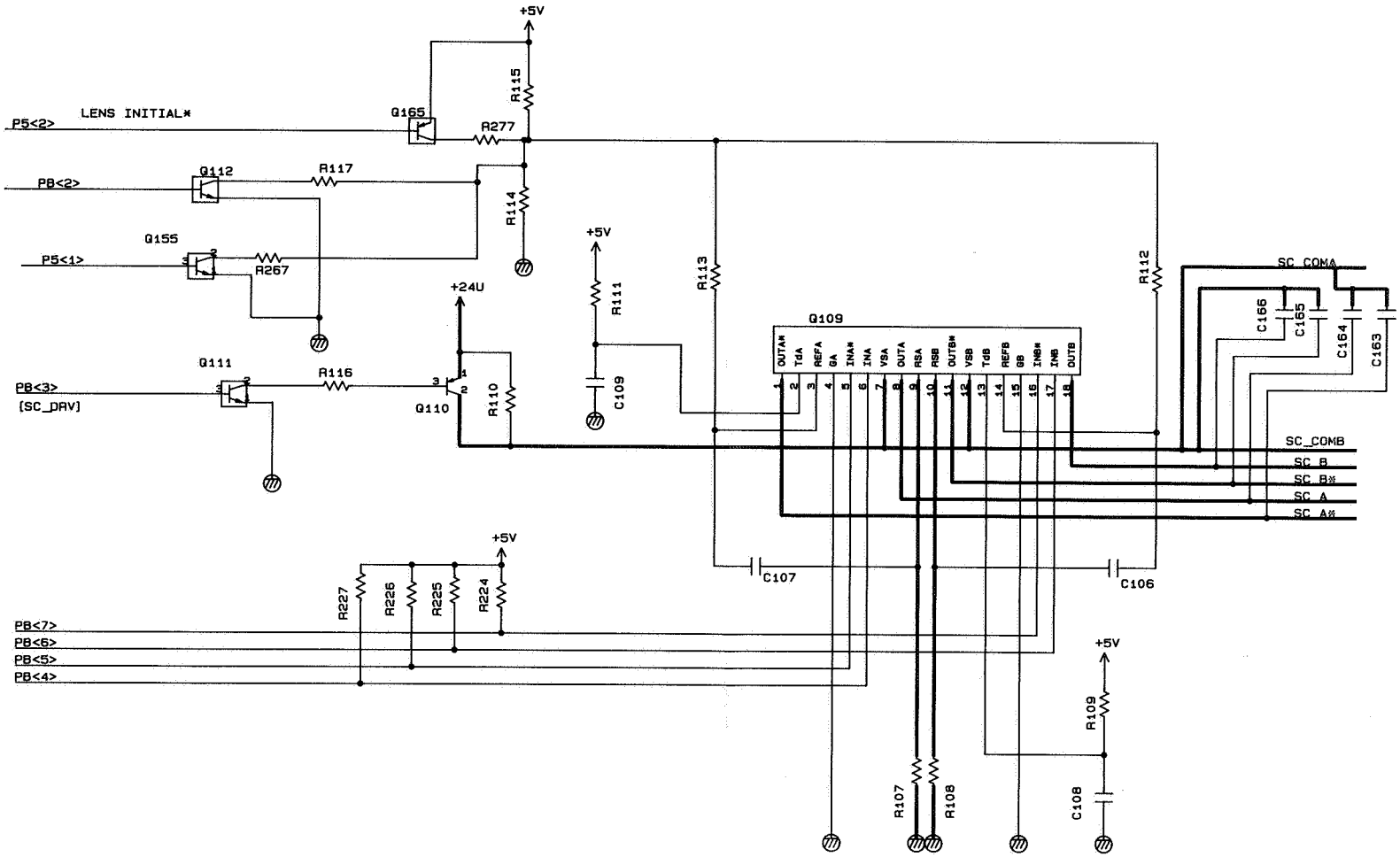

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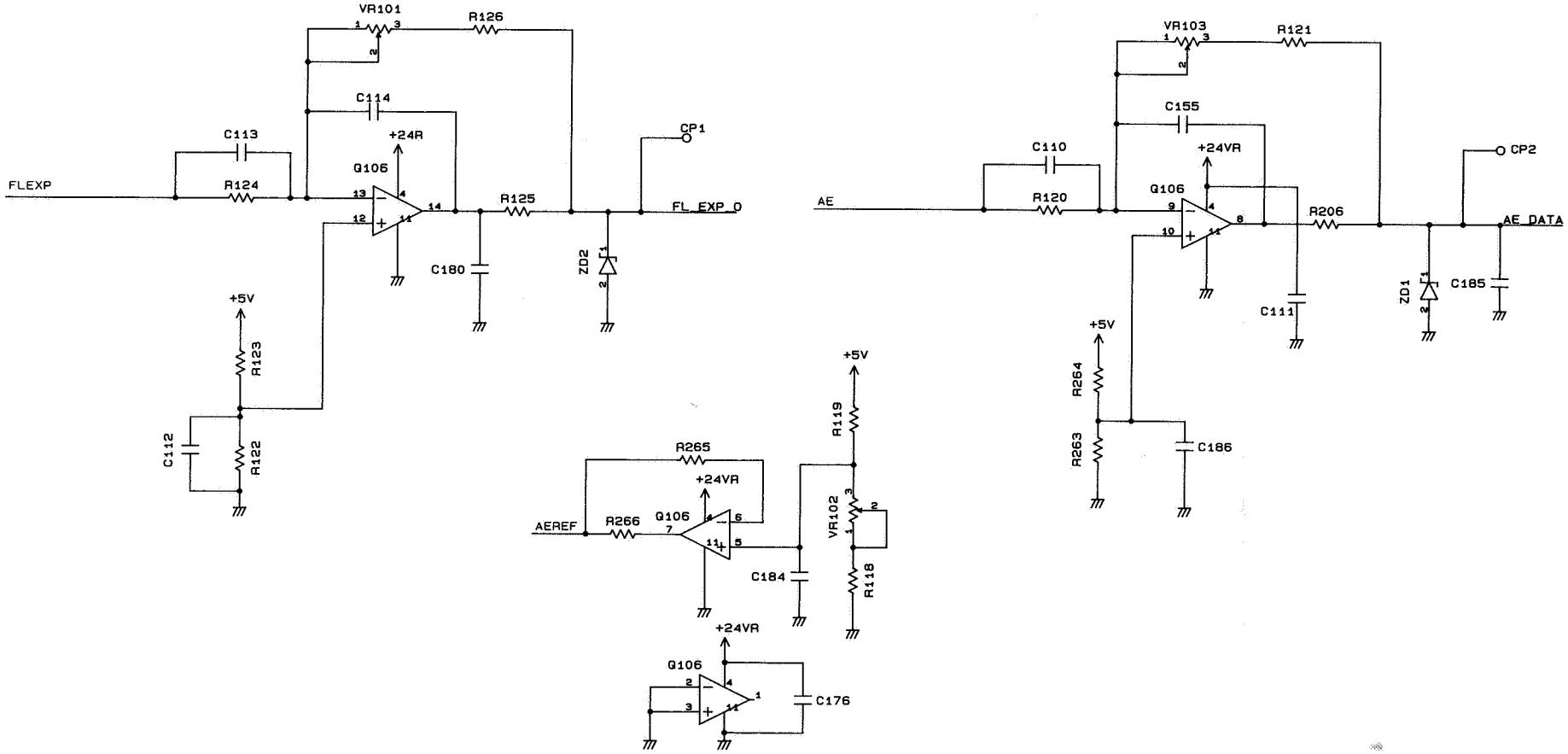

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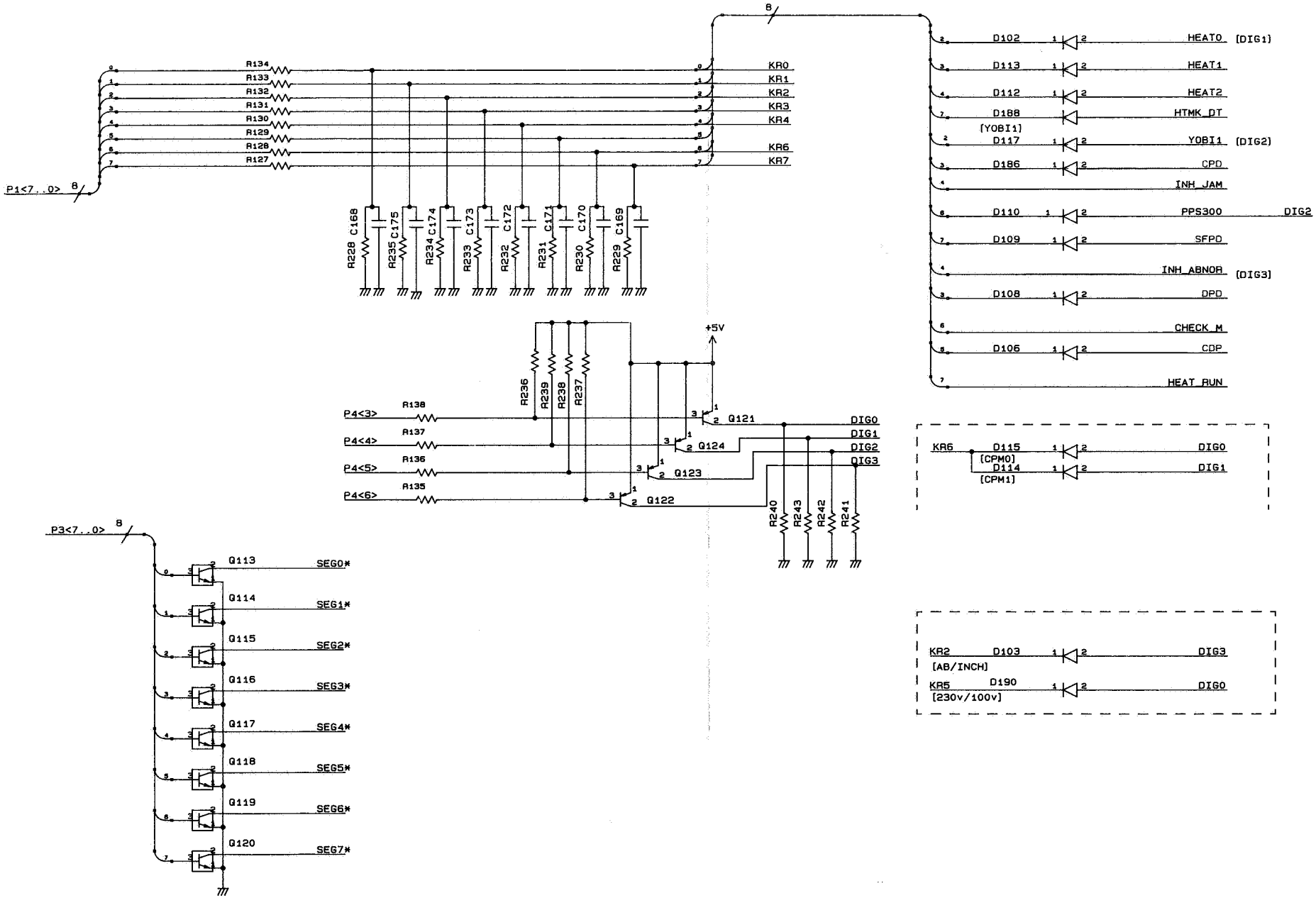
DC controller Circuit Diagram (4/8)



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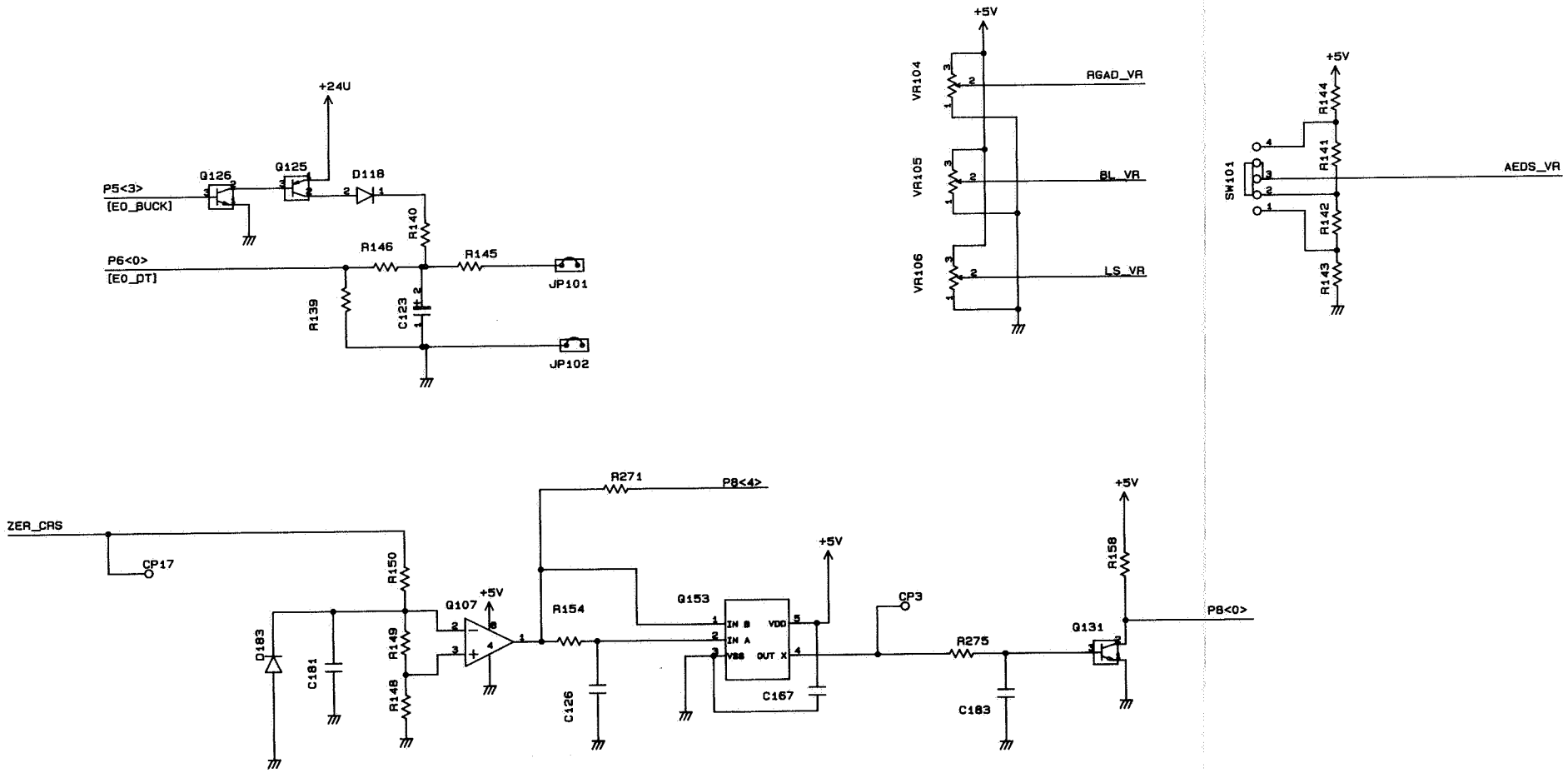

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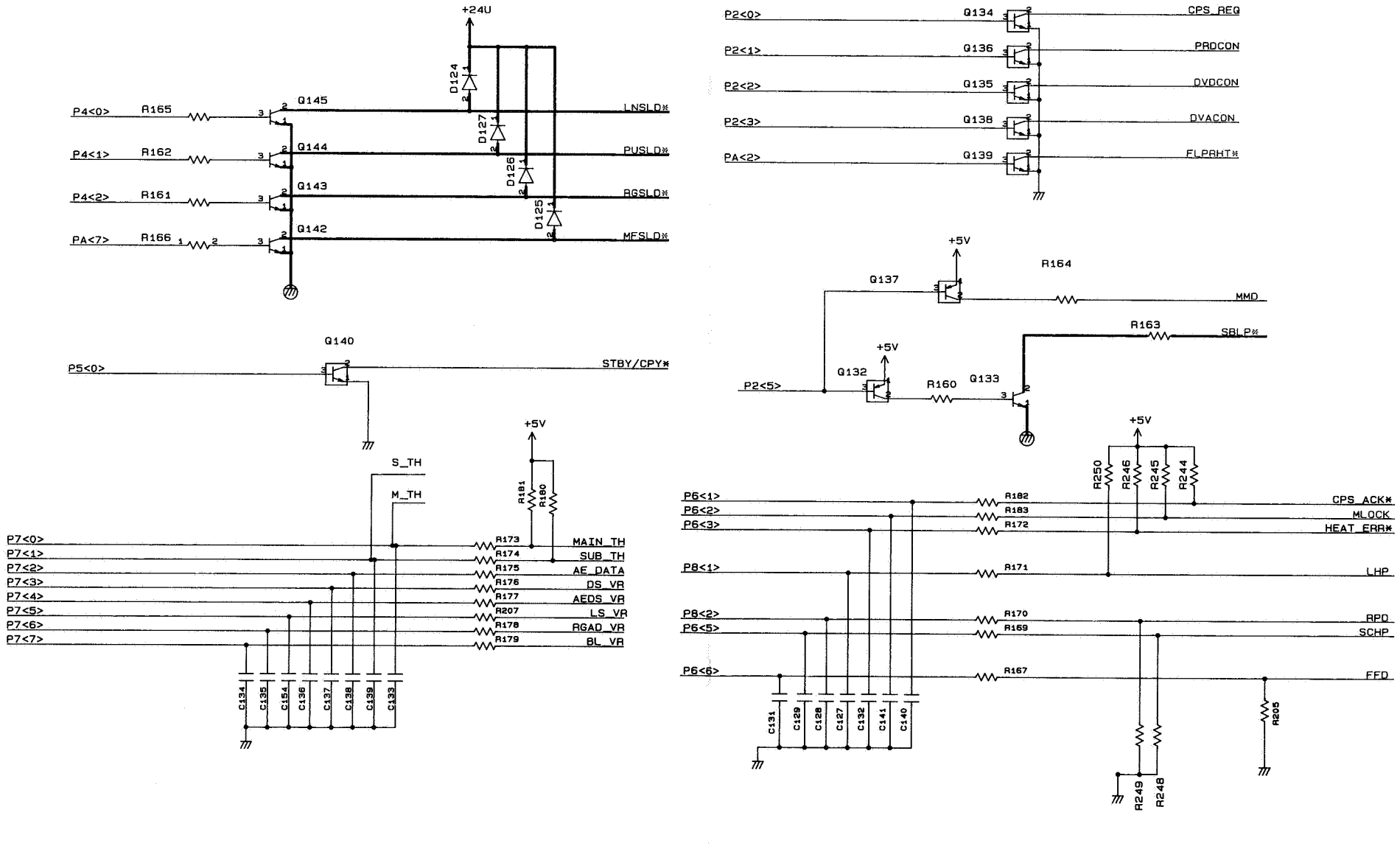
DC controller Circuit Diagram (6/8)



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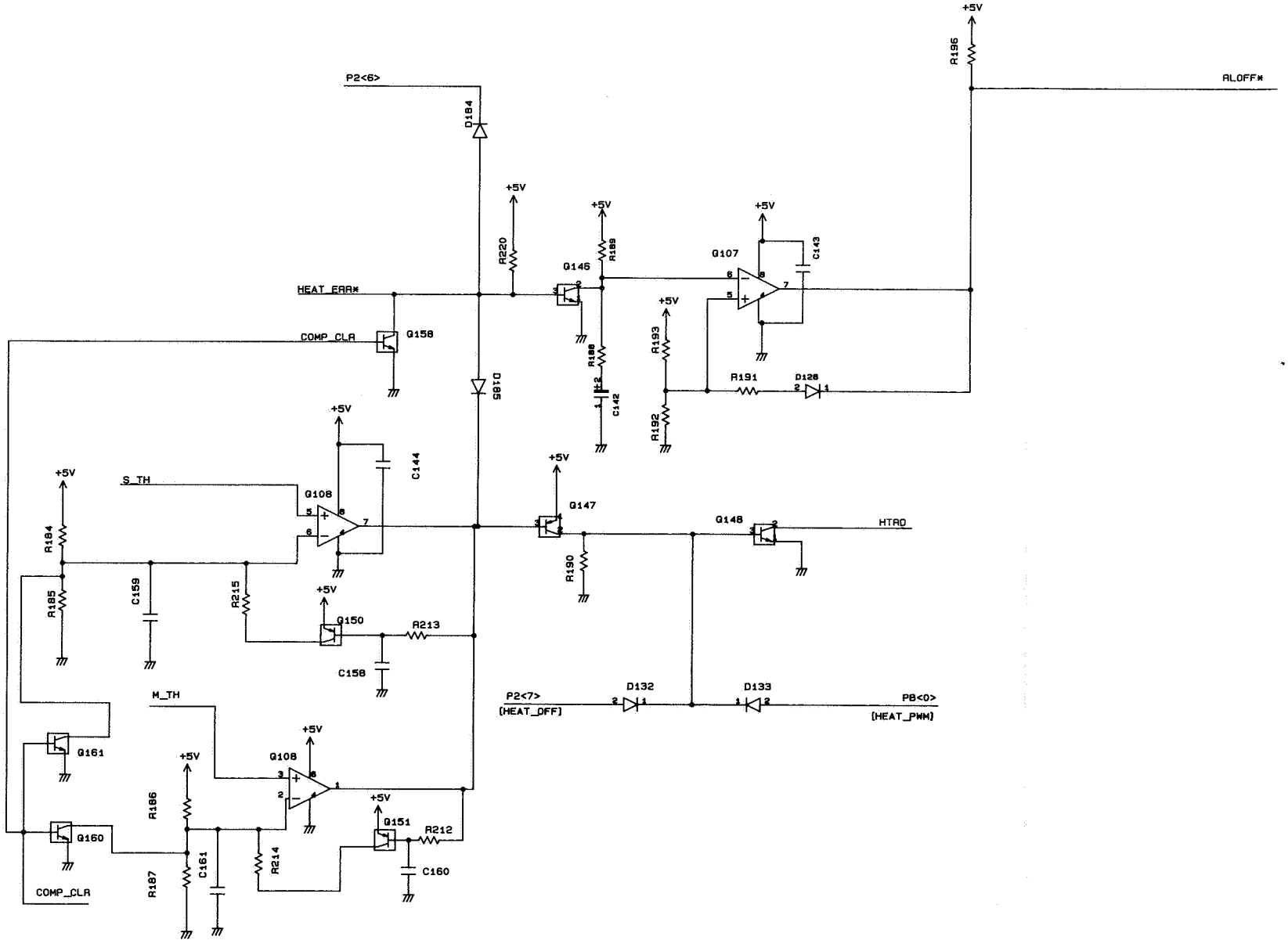

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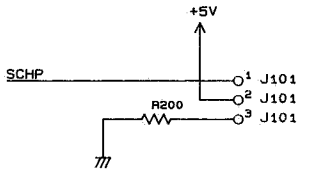
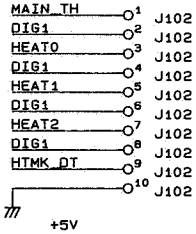
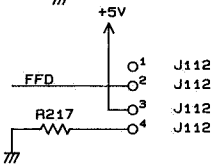
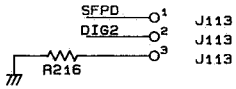
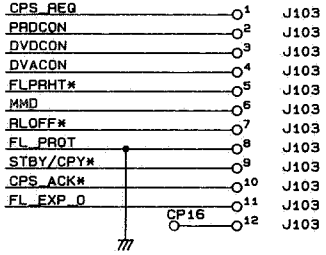
DC controller Circuit Diagram (8/8)

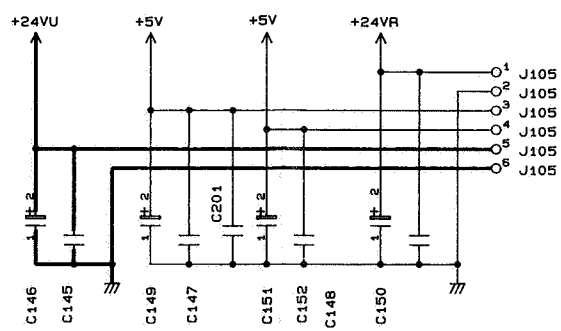


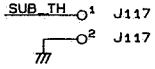


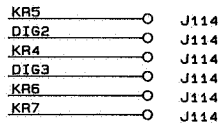


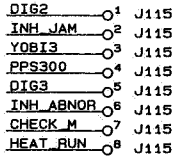


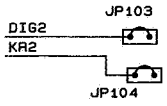


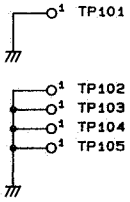


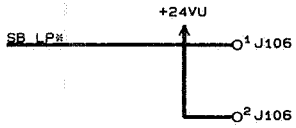


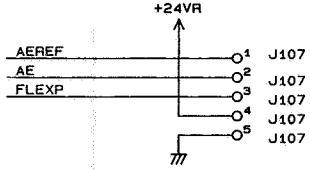


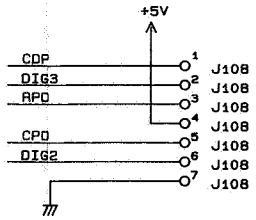


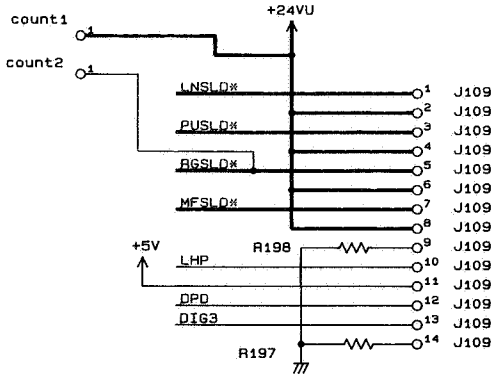


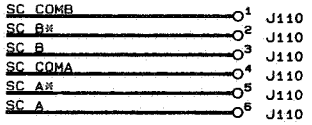


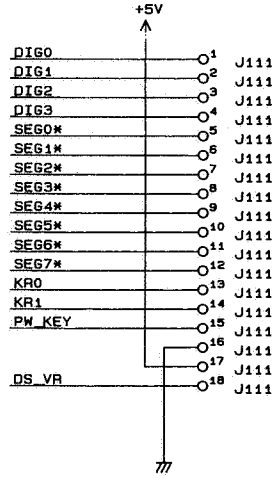












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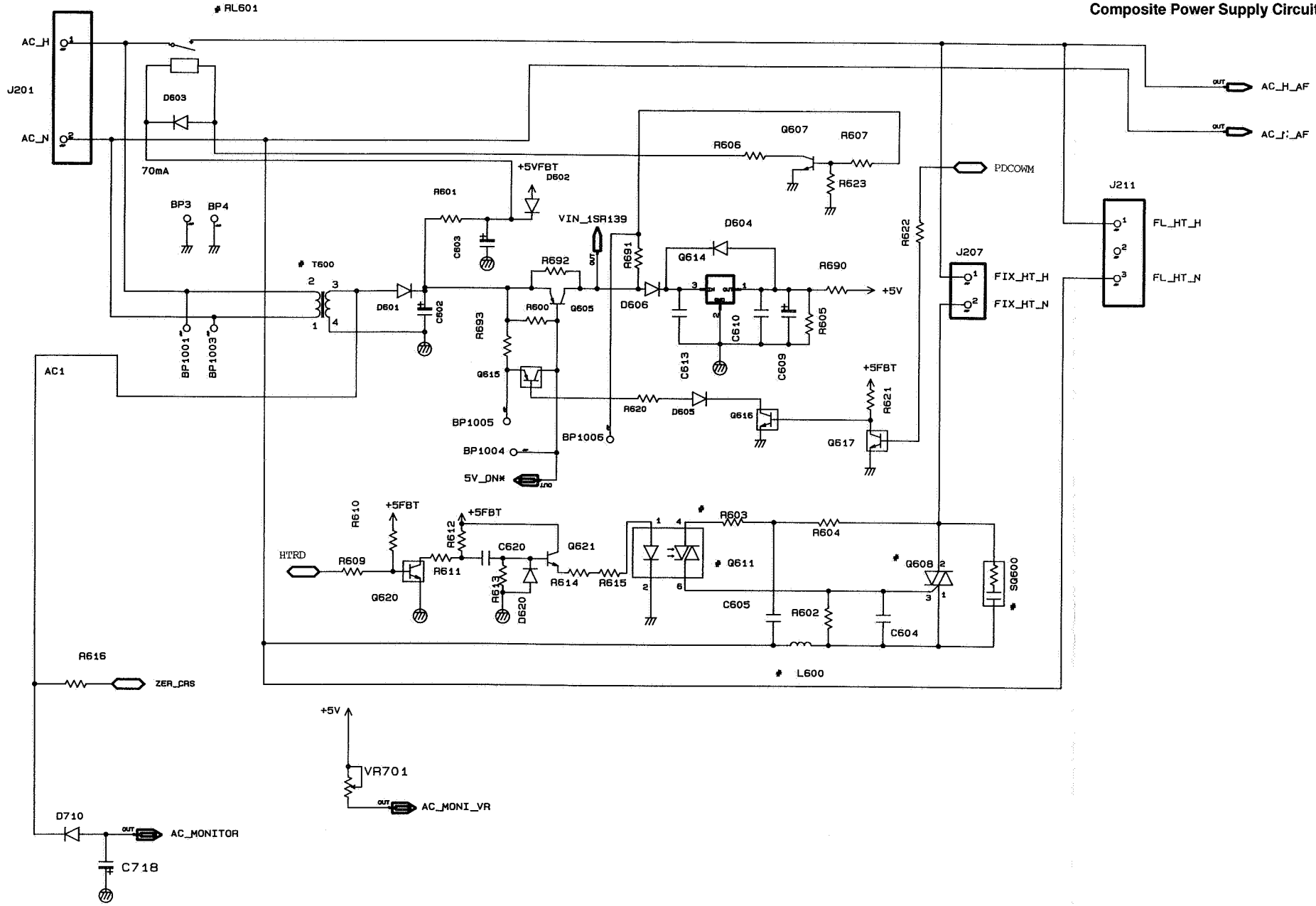
E. COMPOSITE POWER SUPPLY CIRCUIT DIAGRAM

Composite Power Supply Circuit Diagram (1/8)



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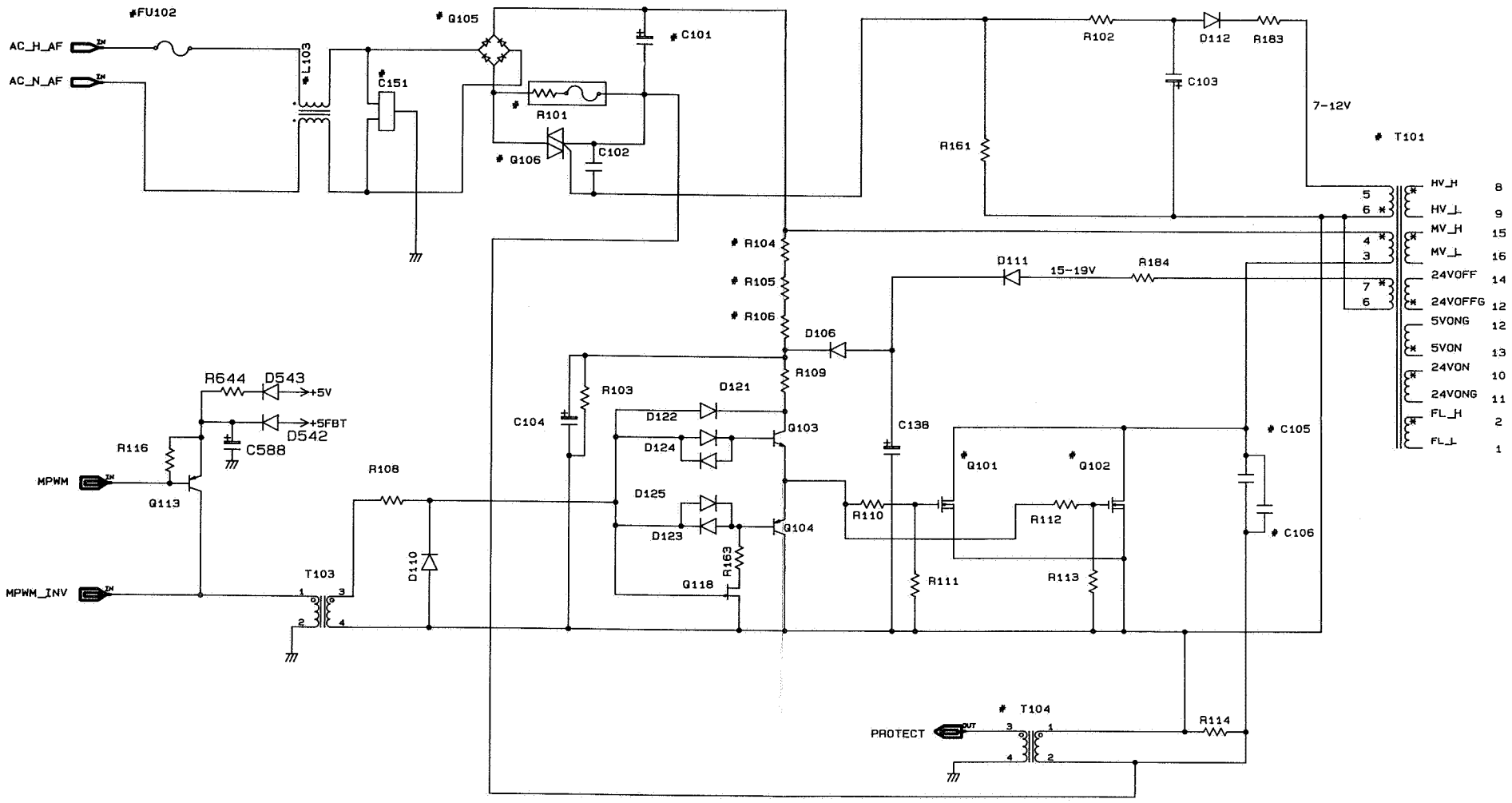
Composite Power Supply Circuit Diagram (2/8)



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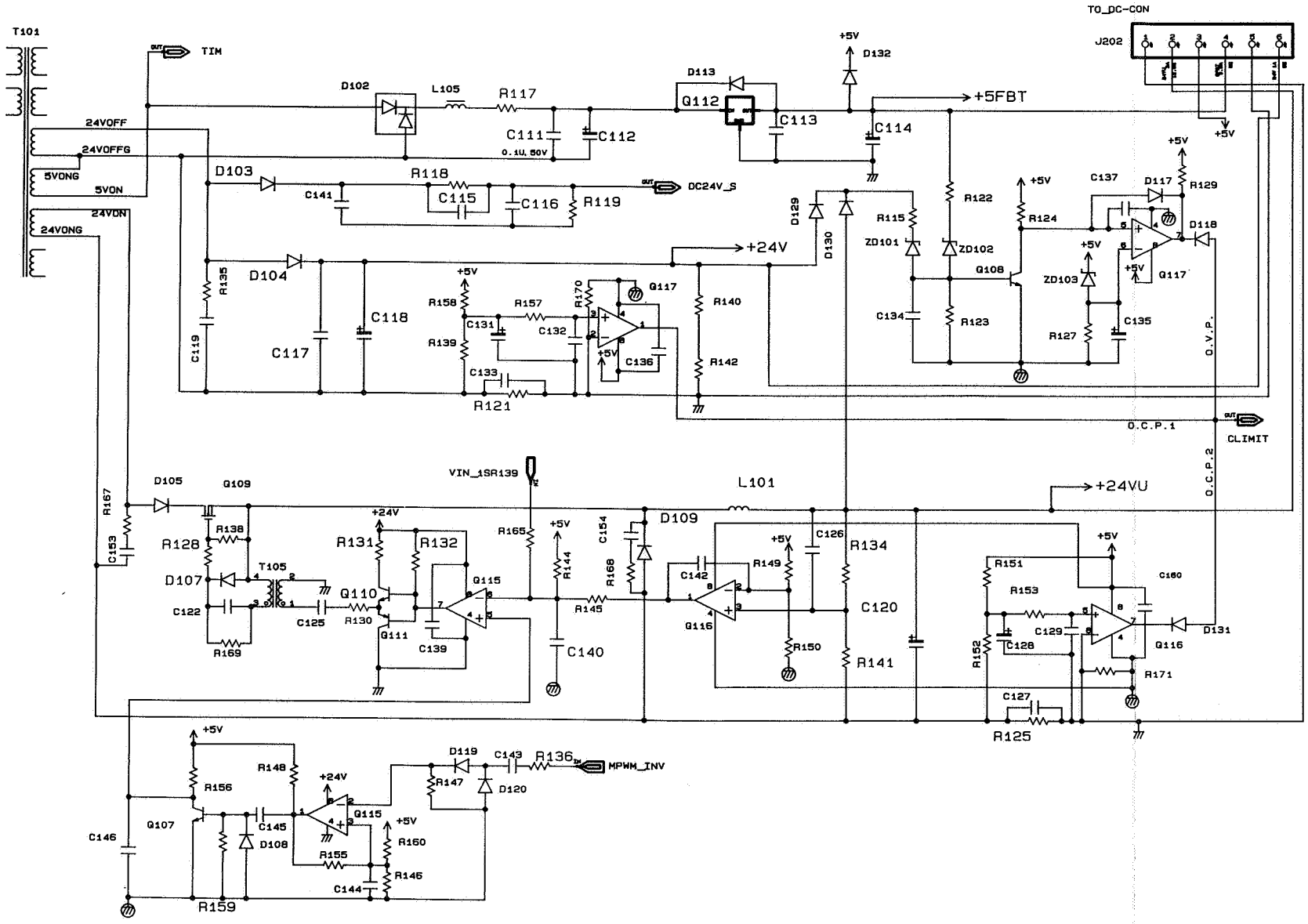

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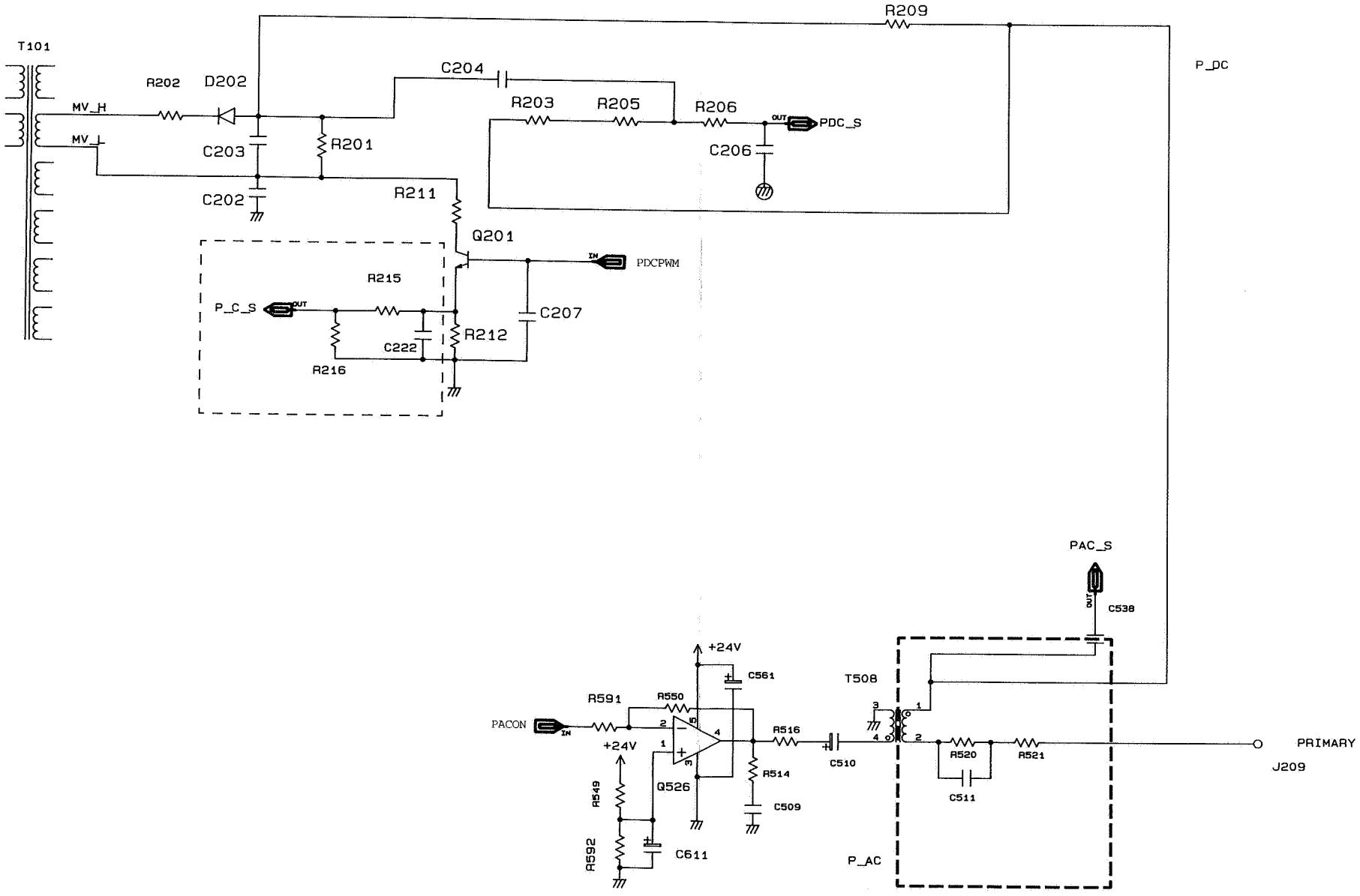
Composite Power Supply Circuit Diagram (4/8)



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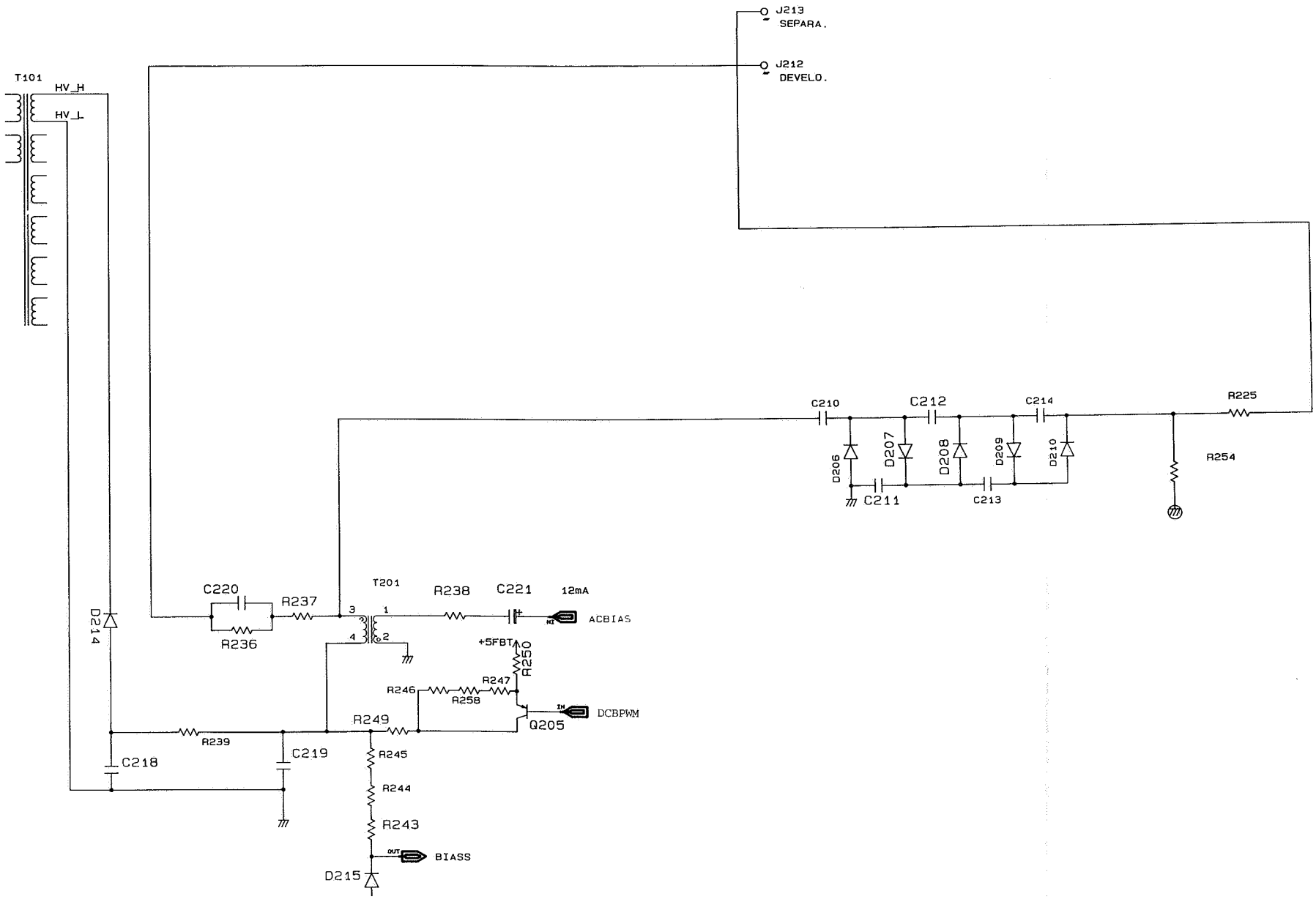

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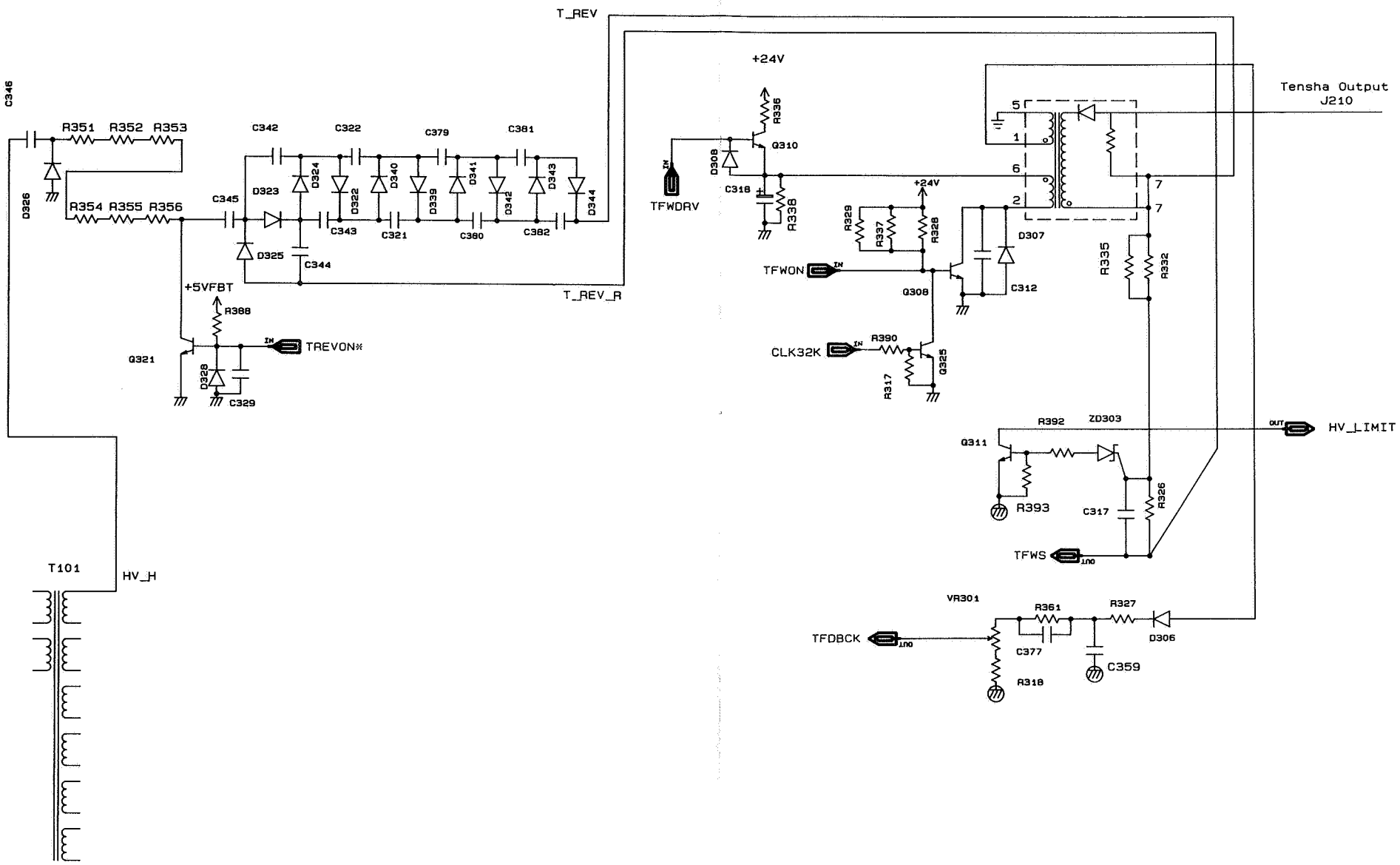
Composite Power Supply Circuit Diagram (6/8)



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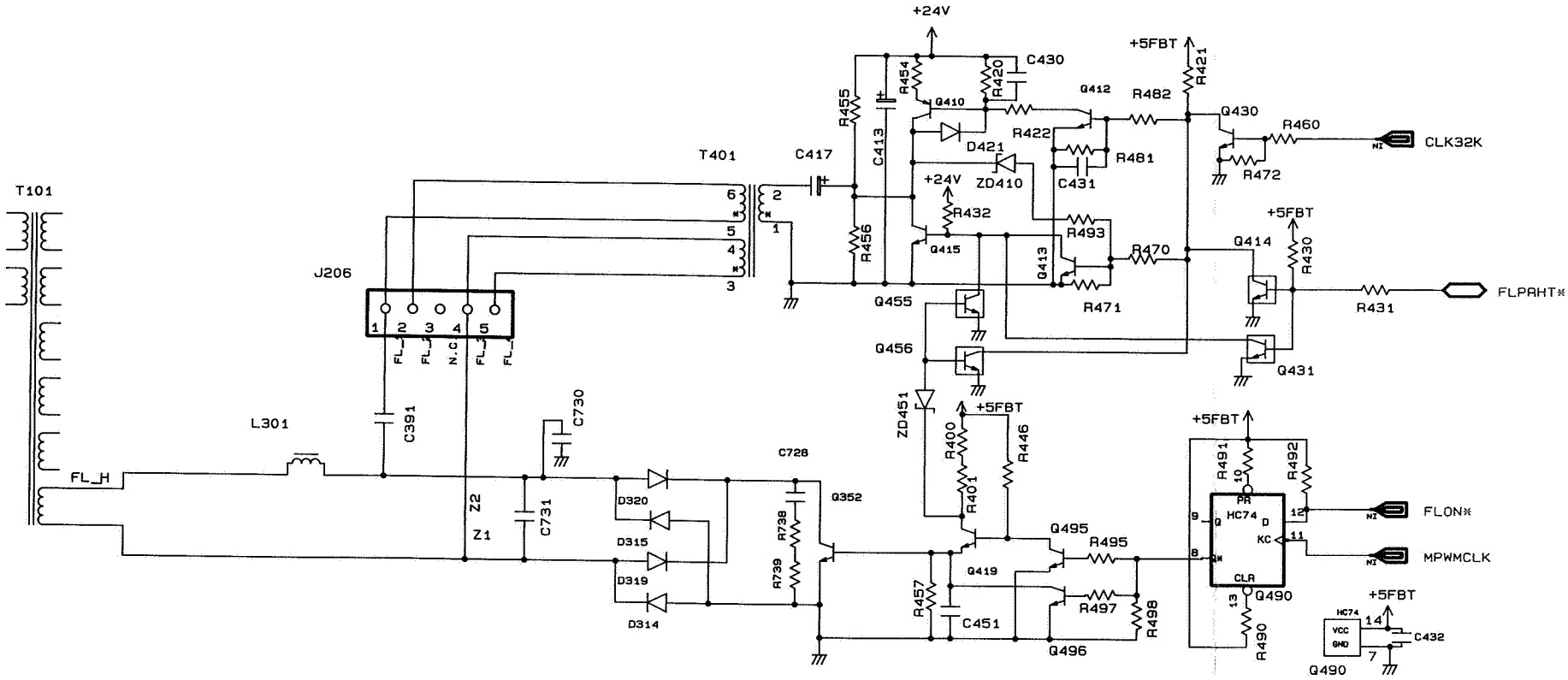
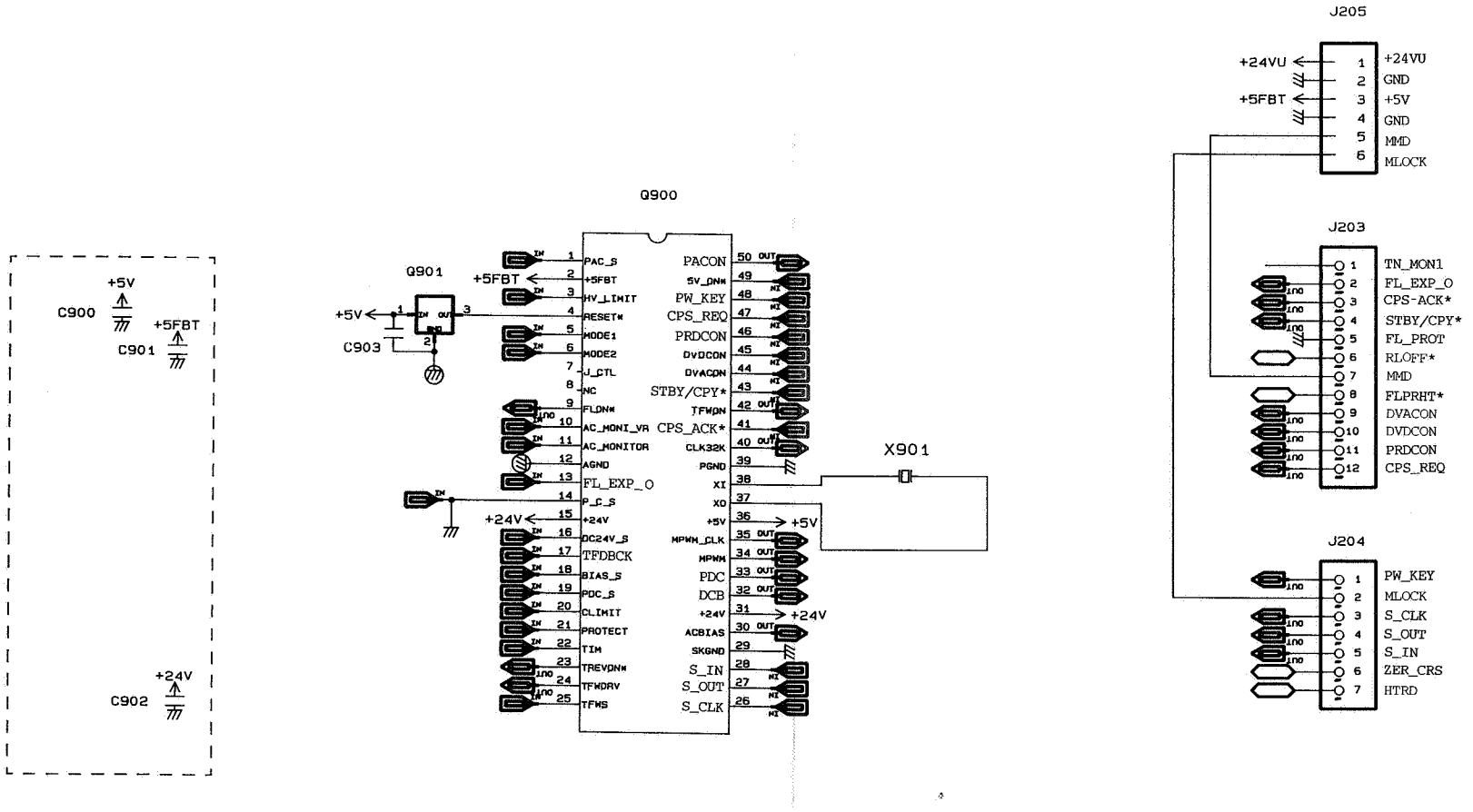

+24V
+5FBT
T101
T401
C417
C430
C420
C454
R455
C413
R454
R420
Q410
Q412
R482
R421
Q430
R460
CLK32K
D421
R422
R481
R472
ZD410
C431
+24V
R432
R493
R470
Q414
+5FBT
R430
J206
R456
Q415
Q413
R471
FLPRHT*
R431
Q455
Q456
Q431
L301
C391
C730
ZD451
+5FBT
+5FBT
R400
R446
C728
R491
R492
FL_H
Z2
Z1
C731
D320
D315
D319
D314
R738
R739
Q352
Q495
R495
FLON*
MPWMCLK
Q419
R457
C451
R497
R498
Q496
Q490
+5FBT
R490
C432
Q490
1
2
3
4
5
6
FL_1
FL_2
N.C
FL_3
FL_4

Composite Power Supply Circuit Diagram (8/8)



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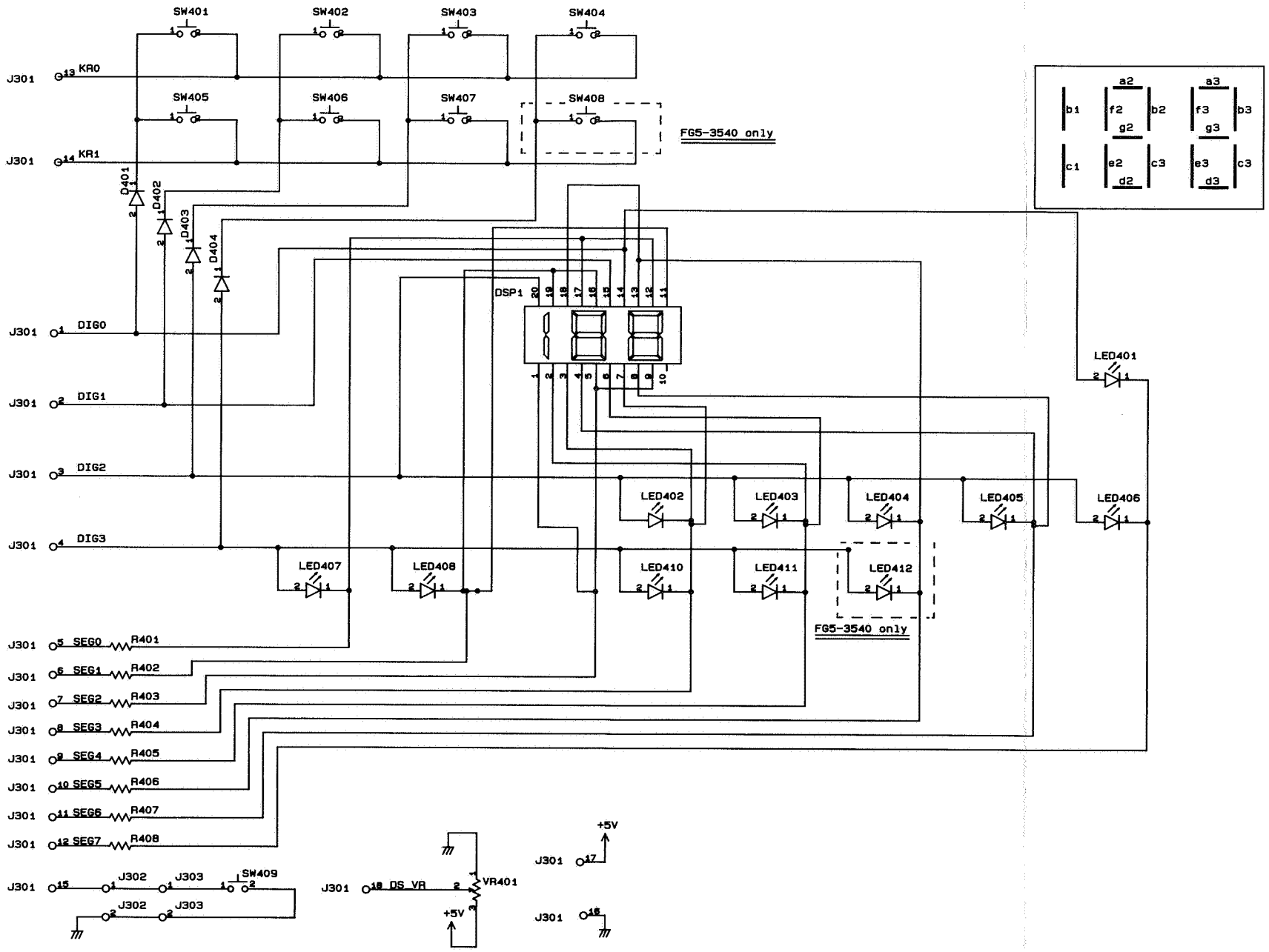
F. CONTROL PANEL CIRCUIT DIAGRAM



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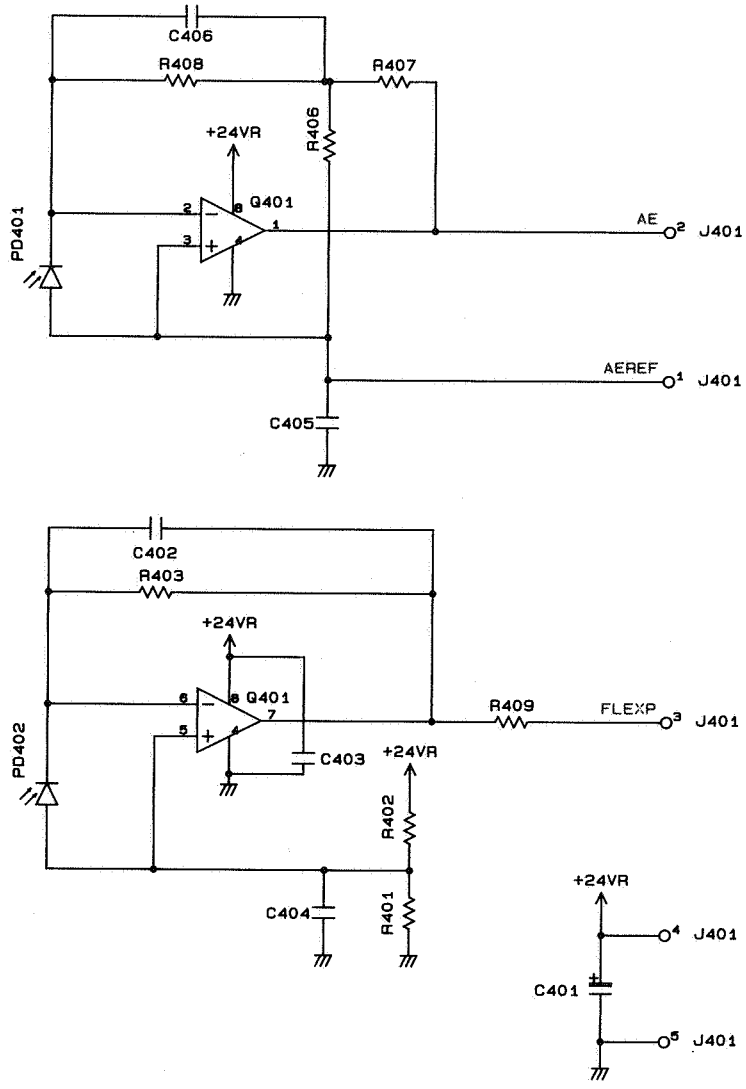
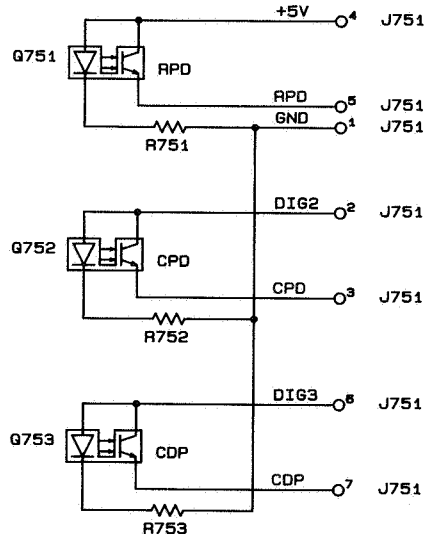
G. INTENSITY/AE SENSOR CIRCUIT DIARGAM



H. SENSOR CIRCUIT DIAGRAM



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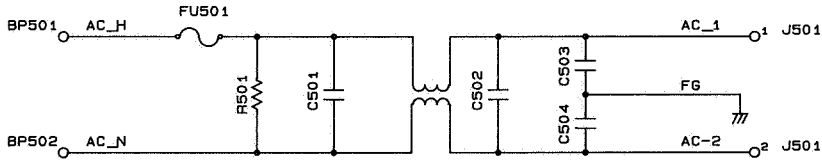
I. NOISE FILTER CIRCUIT DIAGRAM



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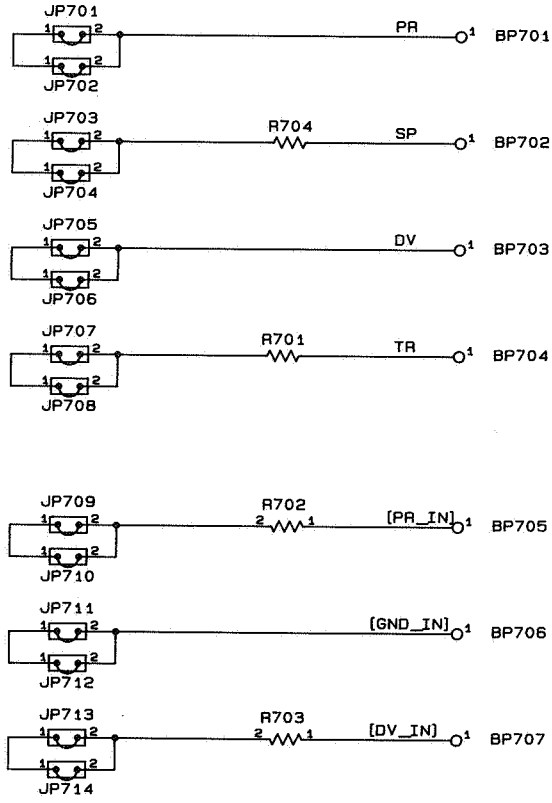
J. HIGH VOLTAGE CONTACT CIRCUIT DIAGRAM



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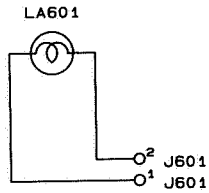
K. BLANK EXPOSURE (front) CIRCUIT DIAGRAM



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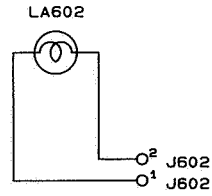
L. BLANK EXPOSURE (rear) CIRCUIT DIAGRAM



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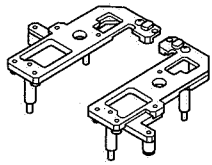
M. SPECIAL TOOLS

You will need the following special tool(s) in addition to the standard tools set when servicing the machine.

No.	Tool	Tool No.	Shape	Rank*	Remarks
1	Mirror positioning tool (pair for front and rear)	FY9-3009-020		B	For adjusting the distance between the No. 1 and No. 2 mirrors.

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N. SOLVENTS/OILS

No.	Name	Uses	Composition	Remarks
1	Alcohol	Cleaning: e.g., glass, plastic, rubber parts; external covers	Hydrocarbon (fluorine family) Alcohol Surface active agent	• Do not bring near fire. • Procure locally. • Isopropyl alcohol may be substituted.
2	Solvent	Cleaning: e.g., metal; oil or toner dirt	Hydrocarbon (fluorine/chlorine family) Alcohol	• Do not bring near fire. • Procure locally.
3	Lubricating oil	Lubricating spring clutch	Mineral oil (paraffin family)	• CK-0451 (100cc)
4	Lubricating oil	Lubricating drive and friction parts, scanner rail	Silicone oil	• CK-0551 (20g)

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Prepared by
OFFICE IMAGING PRODUCTS TECHNICAL SUPPORT DEPARTMENT
OFFICE IMAGING PRODUCTS TECHNICAL SUPPORT DIVISION
CANON INC.
Printed in Japan

REVISION 0 (AUG 1994) [30359]

30-2, Shimomaruko 3-chome, Ohta-ku, Tokyo 146 Japan

Canon

This publication is printed on
70% reprocessed paper.

PRINTED IN JAPAN (IMPRIME AU JAPON) 0894M2.53-1